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Editorial

The journal *Austrobaileya* has primarily been a venue for the publication of plant systematics, taxonomy and nomenclature, although occasional papers on anatomy, biogeography, botanical history, conservation status and karyology, together with book reviews have also been included. Beginning with number 3 of the current volume, the journal will also include papers on broader issues of plant conservation biology, with a particular emphasis on the Queensland flora. Papers in this field can cover topics such as conservation status and autecology for individual taxa or groups or the conservation ecology of selected plant communities.

P.I.Forster

Four new species of *Stylidium* Sw. (Stylidiaceae) from northern Australia

A.R.Bean

Summary

Bean, A.R. (2010). Four new species of *Stylidium* Sw. (Stylidiaceae) from northern Australia. ***Austrobaileya* 8(2): 107–117.** Three new species belonging to *Stylidium* subgenus *Andersonia*; *S. exiguum* A.R.Bean, *S. notabile* A.R.Bean and *S. osculum* A.R.Bean, are described from the Northern Territory. One new species belonging to *Stylidium* section *Floodia* Mildbr., *S. centrolepoides* A.R.Bean, is described from Queensland. All species are illustrated and a distribution map provided.

Key Words: Stylidiaceae, *Stylidium*, *Stylidium centrolepoides*, *Stylidium exiguum*, *Stylidium notabile*, *Stylidium osculum*, Australia flora, Northern Territory flora, Queensland flora, taxonomy, new species

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Introduction

The three new species of *Stylidium* Sw. (Stylidiaceae) named here from the Northern Territory have come to light largely through the collections, photographs and observations of Kym Brennan. While all had been collected beforehand, their status as new species had been overlooked because of the difficulty of interpreting floral characters from pressed *Stylidium* specimens. These new species belong to *Stylidium* subgenus *Andersonia* (R.Br. ex G.Don) Mildbr. A previous revision of this subgenus (Bean 2000) enumerated 37 species. The fourth new species, belonging to *Stylidium* section *Floodia* Mildbr., was collected in 2001 near Croydon in Queensland. A previous revision of this section (Bean 1999) enumerated 12 species.

Materials and methods

The paper is based on the morphological examination of herbarium material at BRI and DNA, including material preserved in spirit. Terminology is the same as that used in Bean (1999) and Bean (2000). Floral measurements are based on material preserved in spirit or reconstituted in boiling water. All other measurements are based on dried material. Length and width dimensions are indicated as length × width followed by the measurement unit.

Accepted for publication 23 July 2010

Taxonomy

Stylidium exiguum A.R.Bean **species nova** *S. nominato* affinis sed petalis omnibus conspicue lobatis, petalis posterioribus quam anterioribus multo longioribus, petalorum posteriorum lobis divergentibus, paracorolla praecipue alba et capsulis brevioribus differens. **Typus:** Northern Territory. Nabarlek, outcrops N of lease entrance, 26 April 2008, *K.Brennan 7576* (holo: BRI [1 sheet + spirit]; iso: DNA).

Stylidum nominatum Carlquist, *sensu* Bean (2000), excl. type.

Annual herb, 3–15 cm high with globose glandular hairs 0.03–0.1 mm long. Rootstock not thickened. Stems present, glabrous. Leaves in basal rosette and scattered along stems, green. Basal leaves 5–15, oblanceolate, 2.5–9 mm long including petiole, 0.5–1.5 mm wide, glabrous, apex obtuse, base cuneate. Cauline leaves 4–11, linear, 2–4.7 mm long including petiole, 0.3–0.7 mm wide, glabrous, apex obtuse or acute, base cuneate or truncate, margins entire. Petioles absent or to 2.5 mm long. Scapes absent. Inflorescences 1–6 cm long, indeterminate; branches monochasially cymose. Bracts linear, 1.5–3 mm long,

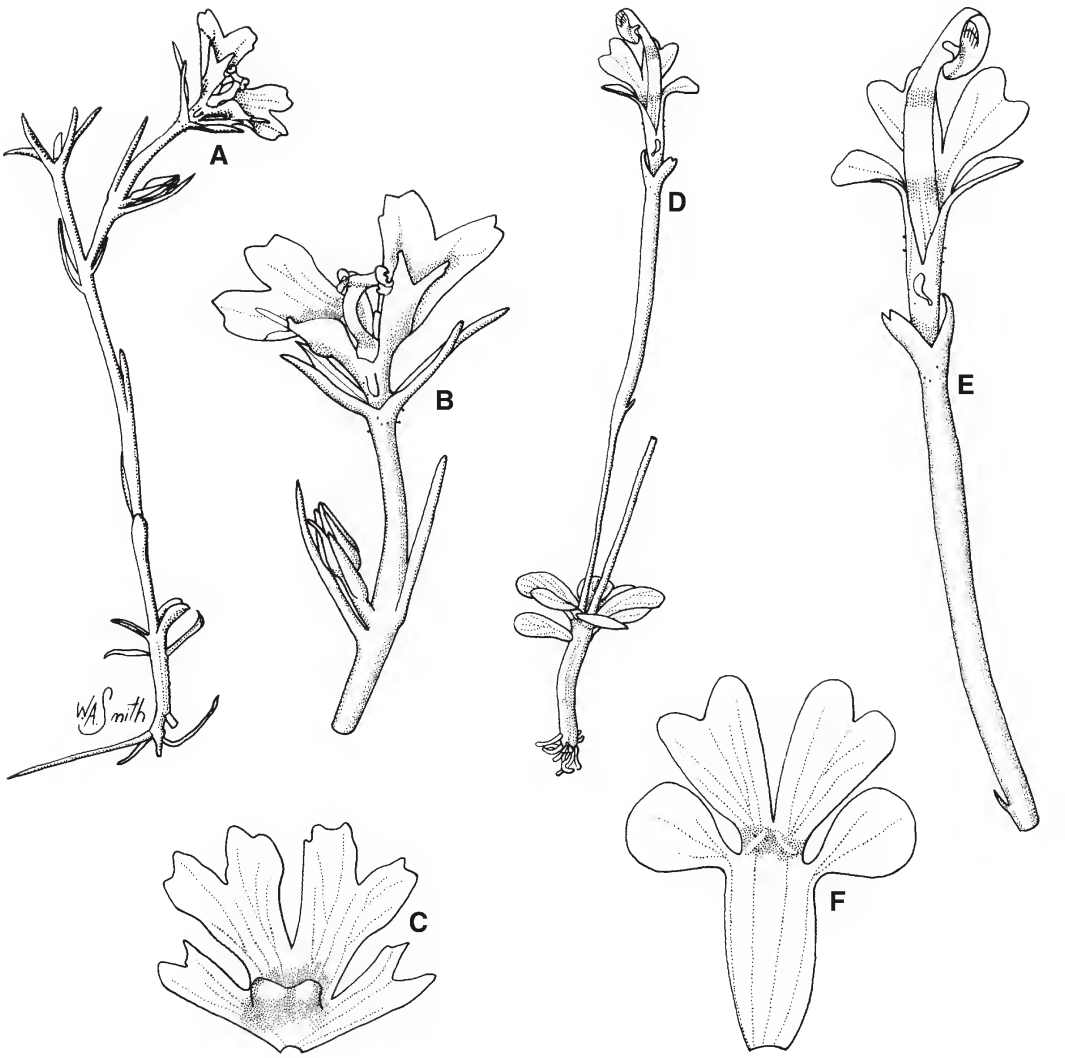

Fig. 1. A–C. *Stylidium exiguum*. A. whole plant × 4. B. flowering branchlet × 8. C. corolla and paracorolla × 8. **D–F. *Stylidium osculum*.** D. whole plant × 2. E. flower × 4. F. corolla and paracorolla × 8. A–C from *Brennan 7560* (BRI); D–F from *Brennan 7539* (BRI).

glabrous, apex obtuse or acute. Pedicels absent. Hypanthium linear, glandular-hairy at distal end only. Sepals deltate, 3 free and 2 mostly fused, 1.2–2.4 × 0.2–0.4 mm, glabrous or glandular-hairy, apex acute. Corolla white, glandular-hairy on tube and underside of petals. Corolla tube 0.5–1.6 mm long, with sinus on anterior side only. Paracorolla discontinuous or continuous, lobed, thin, glabrous, 0.2–0.5 mm high. Paracorolla lobes 2 or 4, similar, hemispherical, <0.2 mm long, obtuse, 2 opposite the posterior petals, 0 or 2 opposite the anterior petals. Paracorolla glands absent. Labellum attached to outside of corolla tube or attached at base of anterior sinus of corolla tube, ovate or lanceolate, 0.3–0.7 mm long, glabrous; terminal appendage absent or present, to 0.2 mm long; basal appendages absent. Petals all free, A1+A2+P1+P2. Anterior petals obdeltate, 0.6–1.9 × 0.6–1.5 mm, bilobed, obtuse. Posterior petals obdeltate, 1.3–3.3 × 1.2–3.3

Fig. 2. ***Stylidium exiguum***. Photograph of corolla, paracorolla and column (from *Brennan 7576*).

mm, bilobed, obtuse. Column 2.5–5 mm long, of uniform width throughout, glabrous, lateral lobes absent, spur absent. Stigma sessile. Capsule linear, without raised longitudinal ribs, 4.5–12 mm long excluding sepals, 0.3–0.6 mm wide, halves detaching distally, not recurving. Seeds ellipsoidal, 0.15–0.2 mm long, brown, smooth. **Fig. 1A-1C, 2.**

Additional specimens examined: NORTHERN TERRITORY. Nabarlek, outcrops N of lease entrance, Apr 2008, *Brennan 7560* (BRI); Melville Island, Apr 1987, *Fensham 481* (DNA); Arnhem Land, 19 km E of Jabiru, Apr 1989, *Johnson 4557* (BRI); Cooper Creek area, Apr 1979, *Rankin 2213* (DNA).

Distribution and habitat: *Stylidium exiguum* is endemic to the Northern Territory, and has been found in Kakadu N.P. and on Melville Island (**Map 1**). It inhabits moist sandy soils in the vicinity of sandstone outcrops.

Phenology: Flowers and fruits are recorded from April to June.

Affinities: *Stylidium exiguum* is closely related to *S. nominatum* Carlquist, and was confused with it by Bean (2000). Both are of small size, possess both basal and cauline leaves, and have small (mostly) white flowers.

In *Stylidium exiguum*, the posterior petals are much larger than the anterior petals, and all petals are deeply bifid. The posterior petals have widely diverging lobes. The paracorolla is mainly white, but tinged with orange or red,

Fig. 3. ***Stylidium nominatum***. Photograph of corolla, paracorolla and column (from *Brennan 7978*).

and the lobes entire (**Fig. 2**). The capsules are 4.5–12 mm long.

In *Stylidium nominatum*, the posterior and anterior petals are about the same size, and they are circular to somewhat obcuneate in shape with an obtuse or emarginate apex. The paracorolla is golden-yellow in colour and the lobes bifid (**Fig. 3**). The capsules are 12–15 mm long.

***Conservation status*: Least Concern** (IUCN 2001). The geographic range exceeds 1000 km^2, and there is no evidence of decline.

***Etymology*:** From the Latin *exiguus* meaning small or meagre, in reference to the stature of the plant.

Stylidium osculum A.R.Bean **species nova** *S. dunlopiano* affinis sed labiis calycis emarginatis, corolla glabra, praesentia paracorollae, labello paginae exteriori tubi corollae affixo et petalis posterioribus connatis differens. **Typus:** Northern Territory. Edith Falls, above top falls, 10 May 2008, *K. Brennan 7668* (holo: BRI [1 sheet + spirit]; iso: CANB, DNA).

Fig. 4. ***Stylidium osculum***. Photograph of corolla, paracorolla and strongly recurved column (from *Brennan 7539*).

Annual herb, 4–11 cm high with globose glandular hairs 0.03–0.05 mm long. Rootstock not thickened. Stems present, glabrous. Leaves 7–21 per plant, green, scattered along stems or sometimes clustered at upper end of stem, spathulate or obovate. Leaves 5–33 mm long including petiole, 2.6–6 mm wide, glabrous; apex obtuse, base cuneate, margins entire. Petioles 1–20 mm long. Scapes present, 3–10 per plant, green, 0.3–0.4 mm in diameter, glabrous. Inflorescences 4–7 cm long including scape, 1–2-flowered. Inflorescence branches glabrous. Bracts deltate, 0.9–1.1 mm long, glabrous, acute. Bracteoles absent. Pedicels absent. Hypanthium linear, glandular-hairy at distal end only. Sepals fused into 2 broadly ovate emarginate lips, one lip 3-lobed, the other 2-lobed. Sepals 0.8–1.3 × 0.5–0.7 mm, glabrous or sparsely glandular-hairy, obtuse. Corolla pink, glabrous; tube 2.6–2.8 mm long, sinus on anterior side only. Paracorolla discontinuous, thin, glabrous, *c.* 0.1 mm high, lobes 2, similar, obtuse, both at the base of the posterior petals. Paracorolla glands absent. Labellum attached to outside of corolla tube, lanceolate, 0.5–0.6 mm long, thick, glabrous;

terminal appendage present, *c.* 0.2 mm long, acuminate; basal appendages absent. Corolla with posterior petals fused, A1+A2+(P1/P2). Anterior petals orbicular, 1–1.3 mm × 0.9–1.2 mm, entire, obtuse. Posterior petals obdeltate, 2–2.5 × 1–1.2 mm, bilobed, obtuse. Column 6.5–7.5 mm long, of uniform width throughout or slightly dilated near distal end, glabrous; lateral lobes present, 0.4–0.5 mm long. Column spur absent. Stigma sessile. Capsule linear, without raised longitudinal ribs, 11–22 mm long excluding sepals, 0.4–0.8 mm wide, halves detaching distally and strongly recurving. Seeds globose or ellipsoidal, 0.15–0.25 mm long, brown, colliculate. **Fig. 1D–F, 4.**

***Additional specimens examined*:** Northern Territory. Edith Falls, at start of Jatbula track, Apr 2008, *Brennan 7539* (BRI); Katherine Gorge N.P., Jun 1975, *Dunlop 3766* (CANB, DNA, NSW); 18 miles [29 km] NE of Katherine, Feb 1965, *Wilson 341* (CANB, DNA).

***Distribution and habitat*:** Recorded from Katherine Gorge and Edith Falls, both in the Nitmiluk National Park, near Katherine in the Northern Territory (**Map 1**). It occurs in receding shallow pools in the bed of a small seasonal stream between sandstone hills. Other *Stylidium* species growing nearby on damp sand included *S. adenophorum* Lowrie & Kenneally and *S. pedunculatum* R.Br.

***Phenology*:** Flowers and fruits are recorded for February, April and May.

***Notes*:** This species has primarily an aquatic habit. Plants are rooted in shallow pools of water, and the erect stems and flowering scapes are emergent from the water.

***Affinities*:** *Stylidium osculum* is perhaps most closely related to *S. dunlopianum* Carlquist, as both have a substantial stem, similar leaf shape, lateral lobes on the column, and sepals fused into two lips. However, *S. osculum* differs by the emarginate calyx lips (entire in *S. dunlopianum*), the glabrous corolla (conspicuously glandular-hairy in *S. dunlopianum*), the presence of a paracorolla (absent in *S. dunlopianum*), the labellum attached to the outside of the corolla tube (attached at base of anterior sinus in *S. dunlopianum*), and the fused posterior petals (free in *S. dunlopianum*).

***Conservation status*: Near Threatened** based on criterion D (IUCN 2001). It has a quite small extent of occurrence, but there is no evidence of decline.

***Etymology*:** The epithet is from the Latin *osculum* meaning "little mouth" or "kiss", and is given in reference to the sepals that are fused into two groups and resemble a little mouth. It is used here as a noun in apposition.

Stylidium notabile A.R.Bean **species nova** *S. muscicola* affinis sed inflorescentia dichasialiter ramificanti, sepalis et tubis corollarum longioribus, labello paginae exteriori tubi corollae affixo, petalis posterioribus connatis longioribus ellipticis et columna multo longiore lobis lateralibus carentibus differens. **Typus:** Northern Territory. Kakadu National Park, near East Alligator River, 29 April 1999, *I.D.Cowie 8325 & C.R.Dunlop* (holo: BRI; iso: CANB, DNA, MEL).

Annual herb, 15–40 cm high with globose glandular hairs 0.1–0.15 mm long. Rootstock not thickened. Stems present, glabrous. Leaves 9–18 per plant, green, mostly in terminal rosette, with some scattered below, obovate or orbicular, 32–56 mm long including petiole, 12–21 mm wide, glabrous, apex obtuse, base cuneate, margins entire. Petioles 12–25 mm long. Scapes 1–4 per plant, green, 0.5–1.1 mm in diameter, glandular-hairy. Sterile bracts absent. Inflorescences 15–25 cm long including scape. Inflorescences determinate, dichasially cymose; branches glandular-hairy. Bracts lanceolate or ovate, 0.7–1.9 mm long, glabrous, apex obtuse. Bracteoles absent. Pedicels absent. Hypanthium linear, glandular-hairy throughout. Sepals elliptical, 3 free and 2 mostly fused, 2.4–3 × 0.4–0.6 mm, glandular-hairy, apex obtuse or acute. Corolla pink, glabrous or glandular-hairy on tube only. Corolla tube 3.5–4 mm long, with sinus on anterior side only. Paracorolla absent or with 2 small pink obtuse lobes, < 0.1 mm long, at the base of the posterior petals. Labellum attached to outside of corolla tube, lanceolate, 0.4–0.6 mm long, glabrous, terminal appendage absent, basal appendages absent. Petals with posteriors fused, A1+A2+(P1/P2). Anterior petals ovate

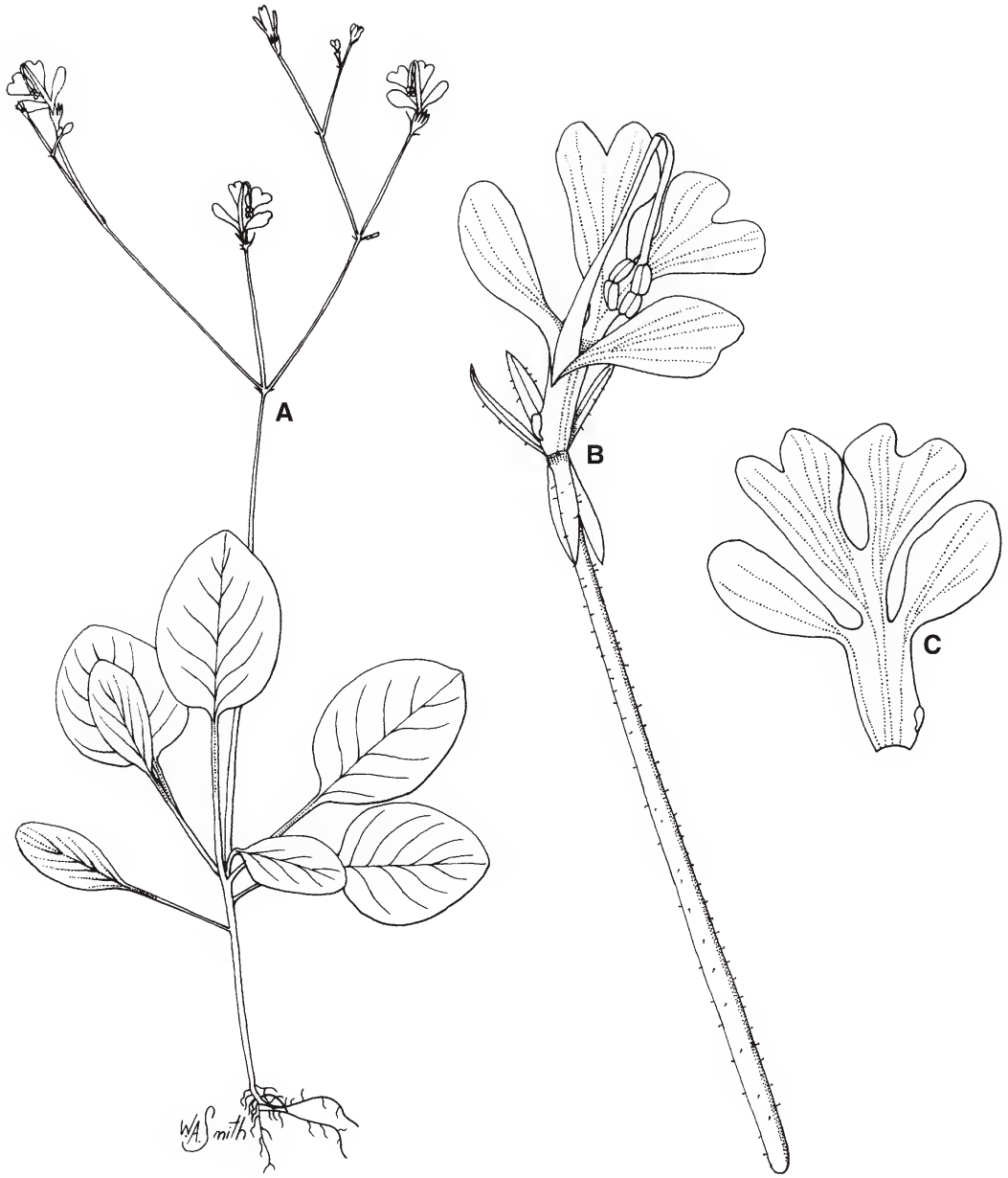

Fig. 5. ***Stylidium notabile***. A. whole plant × 0.8. B. flower × 4. C. corolla × 4. All from *Brennan 2116* (DNA).

or orbicular, 3.5–5.5 × 2–3 mm, shortly bilobed or entire, apex obtuse. Posterior petals elliptical to obovate, 6–9 × 1.5–2.5 mm, bilobed, obtuse. Column 13–16 mm long, of uniform width throughout, glabrous, lateral lobes absent, spur absent. Stigma sessile. Capsule linear, with raised longitudinal ribs, 17–22 mm long excluding sepals, 0.5–0.7 mm wide, halves detaching distally, not recurving. Seeds ellipsoidal, 0.15–0.2 mm long, brown, smooth. **Fig. 5 & 6.**

Fig. 6. ***Stylidium notabile***. Photograph of corolla and strongly recurved column (from *Brennan 7578*).

***Additional specimens examined*:** NORTHERN TERRITORY. 6.3 km SE of Cahills Crossing, May 1994, *Brennan 2851* (DNA); Kakadu N.P., Mar 1999, *Brennan 3696* (DNA); East Alligator River, Ubirr, Apr 1995, *Brennan 3171* (DNA); East Alligator, in Njarridj complex, Mar 1993, *Brennan 2116* (DNA); Kakadu N.P., Obiri Rocks area, Apr 1987, *Purdie 3147* (CANB, DNA); Obiri Rock (Ubirr), May 1987, *Wannan UNSW20301* (BRI).

***Distribution and habitat*:** *Stylidium notabile* grows on sandstone rock outcrops around Ubirr near the East Alligator River in Kakadu N.P. (**Map 1**).

***Phenology*:** Flowers and fruits are recorded from March and May respectively.

***Affinities*:** *Stylidium notabile* is related to *S. muscicola* F.Muell. The latter name is currently applied to two or more undescribed species. The present author has examined the type of *S. muscicola*, and the species described here as *S. notabile* differs from typical *S. muscicola* by the dichasially branched inflorescences, the longer sepals and corolla tubes, the labellum attached to the outside of the corolla tube, the longer elliptical posterior petals that are fused near their base, and the much longer column without lateral lobes. According to M.Barrett (*pers. comm.* 2009), a trigger plant similar to *S. muscicola* but with

larger pink flowers occurs in the Kimberley region of Western Australia. It is possible that this is referrable to *S. notabile*.

***Conservation status*: Near Threatened** based on criterion D (IUCN 2001). It has a quite small extent of occurrence, but there is no evidence of decline.

***Etymology*:** From the Latin *notabilis* meaning remarkable, a reference to the large and showy corolla of this species.

Stylidium centrolepoides A.R.Bean **species nova** *S. turbinato* affinis sed fructibus multo brevioribus, columna pedicellisque brevioribus et praesentia elementorum paracorollae duorum longorum gracilium cultriformium differens. **Typus:** Queensland. Burke District: *c.* 1 km N of the Croydon to Strathmore Homestead road, *c.* 31 km (direct) NE of Croydon, 15 May 2001, *G.P.Turpin GPT413 & E.J.Thompson* (holo: BRI; iso: CANB *distribuendi*).

Annual herb to 4 cm high with ellipsoidal glandular hairs 0.1–0.15 mm long. Rootstock not thickened. Stems glabrous. Leaves 20–100 per plant, maroon or reddish-green, mostly in terminal rosette with some scattered below, linear, 5–10 × 0.3–0.7 mm, glabrous, apex acute, base truncate, margins entire. Petioles absent. Scapes 3–8 per plant, maroon or reddish-green, 0.2–0.25 mm in diameter, glandular-hairy. Inflorescences 1–2 cm long including scape. Inflorescences determinate, monochasially or dichasially cymose. Inflorescence branches glandular-hairy. Bracts linear, 0.7–1.4 mm long, glabrous, apex obtuse. Bracteoles absent. Pedicels 1.4–2 mm long, glandular-hairy. Hypanthium obovoid to obconical, glandular-hairy throughout. Sepals oblanceolate, all free, 1.2–1.4 × 0.3–0.4 mm, sparsely glandular-hairy or glabrous, apex obtuse. Corolla pink, tube glabrous, petals glandular-hairy on underside. Corolla tube 0.3–0.4 mm long, with sinus on anterior side only. Paracorolla not continuous, thin, glabrous, comprising two slender outgrowths 0.6–1.3 mm high at the base of the posterior petals. Paracorolla glands absent. Labellum attached at base of anterior sinus of corolla tube, ovate, *c.* 0.4 mm long, thick, glabrous, terminal appendage absent, apex obtuse, basal appendages absent. Petals all free, A1+A2+P1+P2. Anterior petals 1.3–1.5 × 0.4–0.5 mm, entire, apex obtuse or acute. Posterior petals 1.2–1.3 × 0.6–0.7 mm, entire, apex obtuse. Column 1.5–2 mm long, slightly dilated at distal end, with eglandular hairs only, lateral lobes absent, spur absent. Stigma sessile. Capsule ellipsoidal to obconical, with raised longitudinal ribs, 1.3–1.6 mm long excluding sepals, 1.1–1.3 mm wide, halves detaching distally, not recurved. Seeds ellipsoidal, *c.* 0.15 mm long, brown, surface foveolate. **Fig. 7**.

***Additional specimen examined*:** Queensland. Cook District: 'Abington Downs', 13 km N of Bel Bel crossing, 108 km NW of Georgetown, Aug 2006, *Appelman R323 & Wilson* (BRI).

***Distribution and habitat*:** The two known populations of *Stylidium centrolepoides* are north-east of Croydon and north-west of Georgetown in north Queensland (**Map 1**). It is found on flat ground in association with *Melaleuca viridiflora* Sol. ex Gaertn., *Corymbia polycarpa* (F.Muell.) K.D.Hill & L.A.S.Johnson, and at one site, *Eucalyptus melanophloia* F.Muell.

***Phenology*:** Flowers and fruits are recorded for May and August.

***Affinities*:** *Stylidium centrolepoides* is most closely related to *S. turbinatum* Lowrie & Kenneally from the Northern Territory and northern Western Australia, with which it shares a conspicuously ribbed hypanthium and free sepals. It differs, however; by the much shorter fruits, the shorter pedicels and column, and the presence of two long slender knife-like paracorolla elements. *S. centrolepoides* is also related to *S. floodii* F.Muell., a species that is found in the Croydon area. It differs from *S. floodii* by the conspicuously ribbed hypanthium, the knife-like paracorolla elements, the much shorter column, and the shorter fruits.

***Conservation status*:** Data deficient (IUCN 2001). The species does not grow in a special microhabitat (E.J.Thompson, *pers. comm.* 2009) and hence it could be expected to grow over a large area. Presumably, its ephemeral nature and small size have precluded its detection until recent times.

Fig. 7. ***Stylidium centrolepoides***. A. whole plant × 4. B. flower and pedicel × 16. C. corolla and paracorolla × 24. D. fruit × 16. All from *Turpin GPT413 & Thompson* (BRI).

***Etymology*:** The specific epithet is given for the vegetative resemblance between this species and *Centrolepis exserta* (R.Br.) Roem. & Schult., which has leaves of similar size, shape and colour.

Acknowledgements

I am very grateful to Kym Brennan (Department of Natural Resources, Environment, the Arts and Sport, Northern Territory Government) for supplying the excellent plant specimens and photographs, as well as habitat notes. I thank the Director of the Northern Territory Herbarium (DNA) for the loan of specimens, Will Smith (BRI) for the illustrations and the map, and Peter Bostock (BRI) for the Latin diagnoses.

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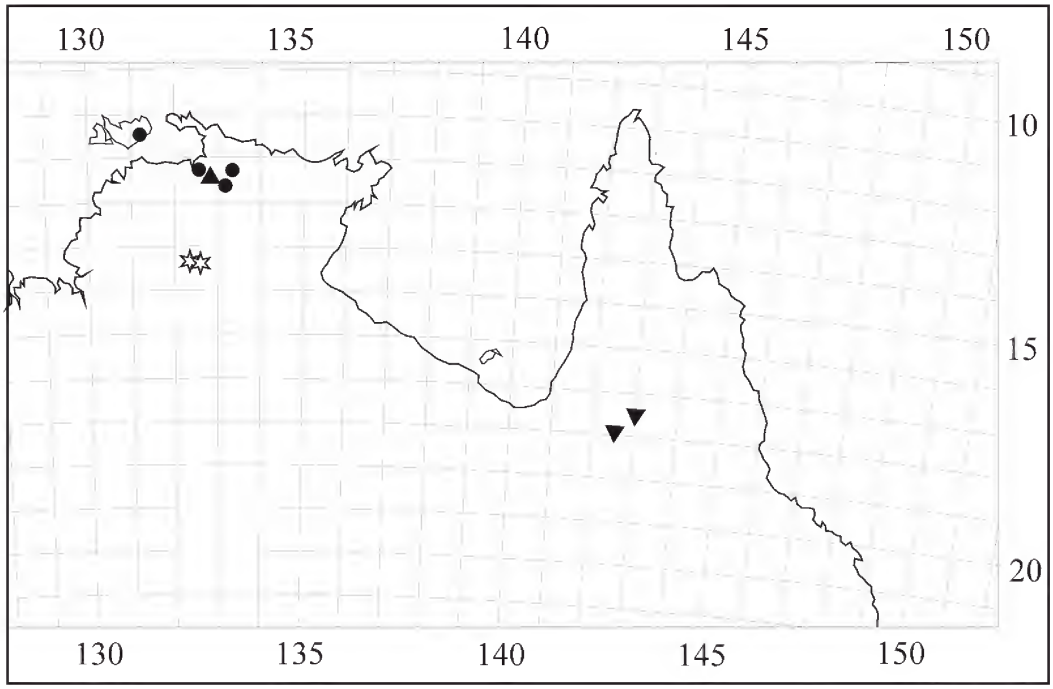

Map 1. Distribution of *Stylidium* species [●] *S. exiguum* [▲], *S. notabile* [✡], *S. osculum*, [▼] *S. centrolepoides*

Book Review

Rainforest Restoration Manual for South-Eastern Australia. Bill Peel (2010). CSIRO Publishing: Melbourne. Softcover, 336 pp, Numerous colour photographs and black & white illustrations; plus CD. ISBN 9780643094710. $120.00 AUD.

Restoration ecology is a difficult, albeit popular pastime in Australia. Many well meaning people devote time, energy and money in attempting to return local vegetation patches to some semblance of pre-European grandeur. Most practitioners learn as they go, or absorb the general principals from others and there have been few published guides on how to go about it.

The current offering is marketed as the "definitive guide to the recovery and restoration of ….rainforests from south-eastern Queensland to Tasmania". Yet, the same spiel narrows this down further to between "Durras Mountain in New South Wales and the Otways in Victoria".

The book includes ten chapters, namely: Background to rainforest restoration; Understanding your rainforest and applying first aid; Your rainforest and ecological context; Immediate actions and site planning; Choosing the method of restoration; Resources; Project planning; Project implementation; What is success in restoration; Maintenance and ongoing ecological management. Restoration ecology in Australia has morphed into a strange mix of principals from the field of conservation biology combined with elements of folklore and philosophy and this is reflected throughout the book. The author states that the "essence of ecological restoration is to understand the concept of ecological resilience". Overall it can be stated that this is a belief or practicality based, rather than scientifically orientated guide, squarely aimed at the lay reader. There are many statements dressed up as facts, but if you want more than you have to load the CD and look at the references for what they are worth, although Wikipedia seems to loom large throughout.

Decisions made by restoration practitioners may echo down through the years, so from a conservation biology perspective, there are a few key areas that should be discussed in a text such as this. The extensive index does not list words such as dispersal, genetics, pollination or population, though "provenance" is mentioned in passing on p. 45 and "keystone species" on three pages. Intriguing indexing entries leads one to "canopy decapitation" and "work variations". Dispersal is covered here and there (e.g. p. 107–108); so the basics are there – just the indexing is poor.

This book does quite extensively cover the effects of predicted climate change and how this will affect the principals and maintenance of restoration plantings. Also well covered are the process of applying for funding and how this is managed and allocated for particular projects. Perhaps most intriguing is the detail given to the correct "rainforest restoration method", even with a taxonomic key to determine which one to use. Much of south-eastern Australia is an ecological basket case where little or nothing is left of the original rainforest vegetation outside of conservation reserves, so this may well be the best way to approach things. This contrasts to the subtropics and tropics where large tracts or numerous remnants still persist and systems are perhaps easier to recreate or enhance.

Although this is an interesting book, it is hard to dive into and one needs to read it from beginning to end to gather the maximum benefit. As with the book on palms (reviewed elsewhere this journal number), CSIRO Publishing has produced a text with a worthless thin card cover that will disintegrate after a few trips out in a vehicle or a backpack to a work site.

Paul I. Forster, Queensland Herbarium.

Cadetia uniflos (F.M.Bailey) M.T.Mathieson, a new combination in Orchidaceae

Michael T. Mathieson

Summary

Mathieson, M.T. (2010). *Cadetia uniflos* (F.M.Bailey) M.T.Mathieson, a new combination in Orchidaceae. ***Austrobaileya* 8(2): 119–124.** *Dendrobium uniflos* F.M.Bailey, originally described in 1884 and subsequently placed in synonymy under *Dendrobium hispidum* F.Muell. var. *taylori* (F.Muell) F.M.Bailey and, in turn, *Cadetia taylori* (F.Muell.) Schltr., is reinstated here and given a new combination in the genus *Cadetia*. A description is provided for the species; this includes the capsule that was previously unknown. Notes on distribution, habitat and conservation status are also given. A key is provided to the Australian species of *Cadetia* Gaud.

Key Words: Orchidaceae, *Cadetia*, *Cadetia uniflos*, *Dendrobium uniflos*, *Cadetia taylori*, taxonomy, Australia flora, Queensland flora, identification key

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Introduction

The genus *Cadetia* Gaud. consists of approximately 60 species distributed throughout Australia, New Guinea, Southeast Asia and India (Jones 2006; Govaerts *et al.* 2010). Species now included in *Cadetia* have been previously described in *Dendrobium*; however, there is widespread consensus as to the generic rank of the former (Schlechter 1912; Jones 2006; Govaerts *et al.* 2010). Five species are currently recognised as occurring in Queensland, namely *Cadetia clausa* D.L.Jones & M.A.Clem., *C. collinsii* Lavarack, *C. maideniana* (Schltr.) Schltr., *C. taylori* and *C. wariana* Schltr. (Bostock & Holland 2007; Clements & Jones 2008; P.Bostock *pers. comm.*); the last-mentioned species has been placed in *Sarcocadetia* (Schltr.) M.A.Clem. & D.L.Jones (Clements & Jones 2002), but this appears not to be widely accepted (Govaerts *et al.* 2010).

Dendrobium uniflos F.M.Bailey has not been recognised since Bailey synonymised it under *Dendrobium hispidum* var. *taylori* (Bailey 1902); it was later included in *Cadetia taylori* (Schlechter 1912; Clements & Jones 2008).

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Although the type specimen of *Dendrobium uniflos*, determined as *Cadetia taylori* in 1988 by M. Clements, has no flower or capsule, a recent collection of a *Cadetia* from north Queensland has been found to be a significantly better match to the protologue description of this species (Bailey 1884) than to *C. taylori* as defined by the type and description by Mueller (1874). Hence the species is reinstated and given a new combination in *Cadetia*, and is illustrated and compared to related species. The distribution, habitat and conservation status of *Cadetia uniflos* (F.M.Bailey) M.T.Mathieson are discussed.

Materials and methods

The type specimen of *Dendrobium uniflos* and all other *Cadetia* specimens held at the Queensland Herbarium (BRI) were examined. N. Walsh (MEL) provided observations on the type specimen of *Cadetia taylori*, held in the collection of the National Herbarium of Victoria, Royal Botanic Gardens, Melbourne. Field observations of wild plants in the genus were carried out during May 2010. The species description is mainly based on a recent collection (*P.I.Forster PIF36932 & M.T.Mathieson*) that is a close match to Bailey's original description of *Cadetia uniflos*.

Taxonomy

Cadetia uniflos (F.M.Bailey) M.T.Mathieson **comb. nov.;** *Dendrobium uniflos* F.M.Bailey, *Proc. Roy. Soc. Queensland* 1: 12 (1884). **Type:** Queensland. Cook District: Near Herberton (cultivated Brisbane), *ante* 1884, *J.W.R.Stuart s.n.* (holo: BRI [AQ49739]).

Clumping epiphyte or lithophyte. Pseudobulbs erect, 30–60 mm long, 3.5–5.5 mm diameter with shallow longitudinal ribs, loosely covered (to half length) by remains of sheathing bract; single leaf present at apex of each stem, lamina obovate to lanceolate, 30–52 mm long, 3.5–6 mm wide, weakly emarginate, weakly carinate and weakly revolute, shortly attenuate at base. Flowers borne singly from the apex of the stem, 9–11 mm diameter; floral bracts, linear-lanceolate, 7–10 mm long; pedicels *c.* 16 mm long; ovary *c.* 4 mm long, glabrous; petals, linear, slender and incurved, *c.* 6 mm long when flattened and 0.7 mm wide, white; dorsal sepal narrowly oblong-ovate when flattened, *c.* 6 mm long and 3 mm wide, white; lateral sepals more broadly oblong-ovate when flattened, *c.* 6 mm long, 4–4.5 mm wide, white; column obliquely erect, *c.* 2.5 mm long, 1 mm wide, glabrous; column wings narrow with 2–3 apical projections extending slightly beyond anther; pollinia 4, *c.* 0.5 mm long, oblong, curved, yellow; anther cap white, but can become tinged pink-purple with age and on drying; labellum oblong, 5–6 mm long, *c.* 2.5 mm wide, tri-lobed, orange, lateral lobes triangular, upright, antrorse, orange; mid-lobe cordate, fleshy, strongly recurved, papillate to bullate, sparsely hirsutulous and uniformly coloured bright orange; a small patch of fine, fleshy trichomes *c.* 0.2 mm long at base of mid-lobe; capsule obovoid, elongate, *c.* 17 mm long and 6.5 mm diameter, glabrous; pedicel on mature capsule *c.* 10 mm long. **Fig. 1 & 2.**

Fig. 1. ***Cadetia uniflos***, Hann Tableland, May 2010 (*Forster PIF36932 & Mathieson*). Photograph: M.T.Mathieson

***Additional specimens examined*:** Cook District: 4.5 km west of Karnak, Jul 1994, *Forster PIF15550, Sankowsky & Tucker* (BRI); Hann Tableland National Park, west of Mareeba, May 2010, *Forster PIF36932 & Mathieson* (BRI).

***Distribution and habitat*:** The species is currently known only from three localities from northeast Queensland, spanning *c.* 120 km north to south; Karnak northwest of Mossman, Hann Tableland near Mareeba and the Herberton area. The type specimen of *Cadetia uniflos* was originally collected from the Herberton district on the western edge of the Atherton Tableland some time prior to 1884 by J.W.R. Stuart and subsequently flowered at the Brisbane Botanic Gardens. An accurate collection location of this specimen is not known.

Habitat data was not given for the type specimen. The two recent specimens cited above were collected from evergreen microphyll moss/fern thicket (Karnak) and ecotone between simple notophyll vine forest and wet sclerophyll forests (Hann Tableland), both on granite, at between 950 and 1100 m altitude.

***Notes*:** The closest putative relative of *Cadetia uniflos* in Australia is *C. taylori*, these being the only two Australian species in the section *Ptero-Cadetia* Schltr. They are very similar, differing primarily in labellum structure and occur over a similar distribution range in the Wet Tropics and adjacent Einasleigh Uplands where suitable habitat exists. A decision to reinstate, with the new combination, *Cadetia uniflos*, was made on the basis of differences in the protologue descriptions of this species and *C. taylori* as follows: the description of the labellum of the type specimen of *C. taylori* (as *Bolbophyllum* [*sic*] *taylori*) (Mueller 1874) is "...yellow, kidney-like, semi-orbicular with short stiff hairs above"; recent examination of the type specimen confirms the upper surface of the labellum is prominently covered in trichomes (N.Walsh *pers. comm.* August 2010). Bailey's description of the labellum of the type specimen of *C. uniflos* (as *Dendrobium uniflos*) reads "...surface glandular, texture thick, transversely furrowed, orange coloured" (Bailey 1884). The recent collection from the Hann Tableland, mentioned above, matches Bailey's protologue of *Cadetia uniflos*, which notably, does not mention a hirsute nature to the labellum but simply describes it as glandular, which is interpreted here as papillate – bullate. The two species have not been observed to co-occur.

Cadetia uniflos can be differentiated from *C. taylori* as follows:

C. uniflos: labellum midlobe densely papillate to bullate, somewhat glandular in appearance in life, extremely sparsely hairy and intensely bright orange, having a small patch of fine, distally eglandular trichomes approximately 0.2 mm long or less near the proximal end of the lobe; anther cap generally white when fresh, often becoming pink-tinged with age and on drying.

C. taylori: labellum midlobe uniformly covered in prominent trichomes, eglandular distally, papillate proximally, pale shades of yellow, orange or pink in colour; anther cap generally pink on fresh flowers but may be white.

Comparative photographs of the two species are shown in **Figures 2** and **3.**

***Phenology*:** Flowering time was not specified in the type description. The Karnak specimen was collected while flowering, in July. Those on the Hann Tableland were found flowering profusely in the wild in early May. Since most plants still had buds and some also had fruit, most of which were ripe at the same time, a flowering period spanning at least late March through to July is likely.

***Conservation status*:** Although this species has been recorded from three widely separated localities, it is likely to be found throughout this area in suitable habitat. This paucity of localities is likely to be a consequence of under representation of orchids in herbaria as populations of various *Cadetia* species in northern Queensland are not infrequent (P.I.Forster, *pers. comm.* August 2010).

No information is available about population status at the type locality, the locality itself being poorly defined, while at the Karnak site it was determined to be common. The population at the Hann

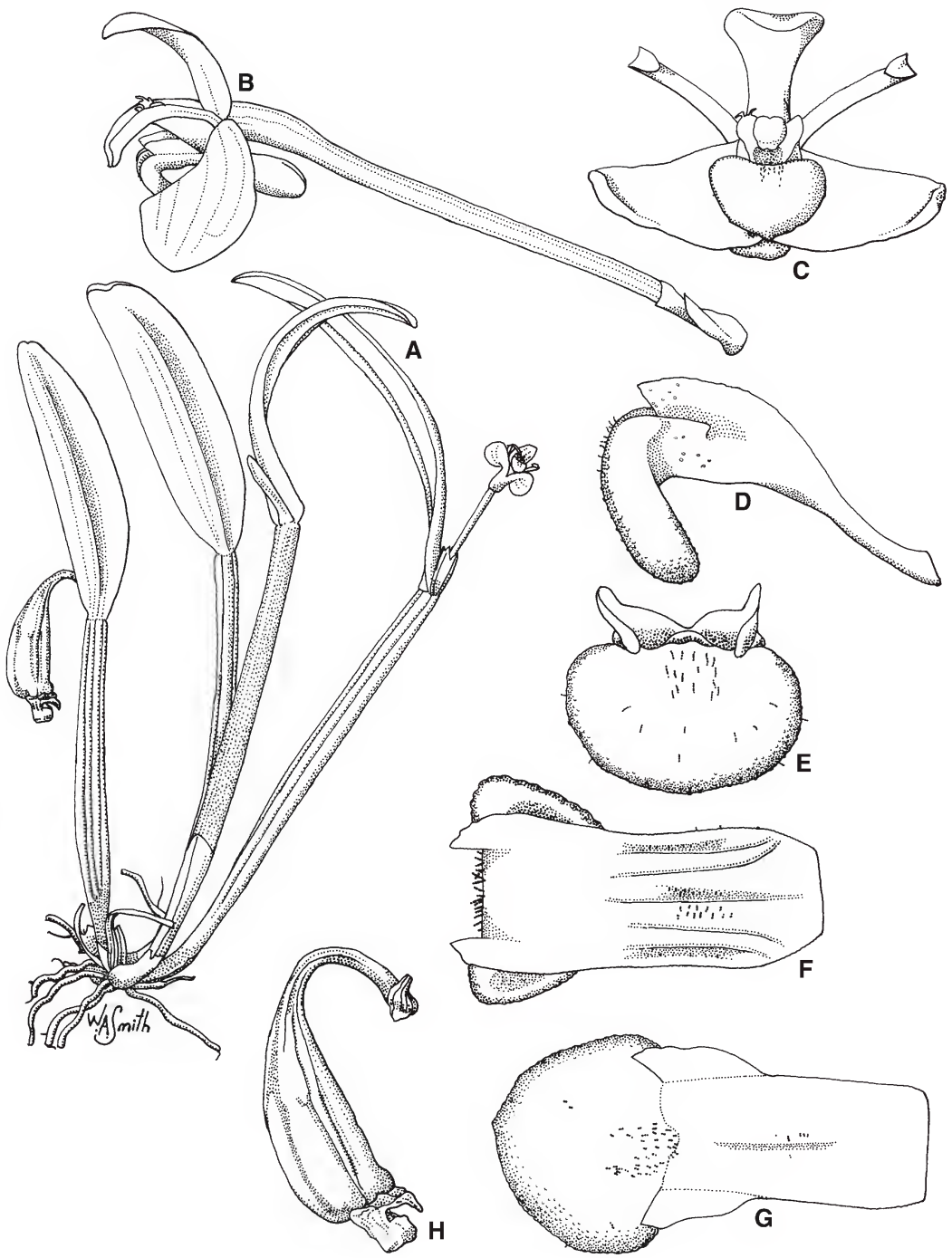

Fig. 2. ***Cadetia uniflos*****:** A. whole plant × 1. B. flower from the side × 4. C. flower from the front × 6. D. labellum from the side × 12. E. labellum from the front × 12. F. labellum from above × 12. G. labellum flattened, from above × 12. H. capsule × 2. All from *Forster PIF36932 & Mathieson* (BRI). Del. W.Smith.

Tableland site was estimated to be between 200 and 500 plants occupying an area of less than ten hectares. Applying criteria of the IUCN Red List of Threatened Species (IUCN 2010), the conservation status is Vulnerable (D2 based on restricted area of occupancy). As the species can occur on the ecotone between wet sclerophyll and upland rainforest, fire is a potential threat to the species. Collection of plants by hobbyists has been and remains a real threat at all localities, especially those with good accessibility (e.g. National Park walking tracks).

Key to the Australian species of *Cadetia*

1 Plants with creeping rhizome; pseudobulbs, short, fleshy, cylindrical-conical; height:width ratio of mature pseudobulbs generally < 4 . . . . . **C. wariana**
1. Plants clumping; pseudobulbs, non-fleshy, slender cylindrical or somewhat flattened; height:width ratio of mature pseudobulbs generally > 4 2

2 Ovary covered in fleshy tubercles 3
2. Ovary glabrous 5

3 Pseudobulbs generally < 20 mm long on mature plants, cylindrical . . . . . **C. collinsii**
3. Pseudobulbs generally > 40 mm long on mature plants, flattened, widening at apex 4

4 Labellum distinctly lobed; lateral lobes broad, blunt; capsules obovoid, *c.* 5 mm long × 4 mm diameter . . . . . **C. clausa**
4. Labellum barely lobed, lateral lobes vestigial, pointed (toothlike); capsules obovoid, *c.* 8 mm long × 7 mm diameter . . . . . **C. maideniana**

5 Upper surface of labellum midlobe papillate, prominently and largely uniformly covered in trichomes; pale colours of yellow, orange or pink; anther cap generally pink-tinged . . . . . **C. taylori**
5. Upper surface of labellum midlobe papillate to bullate, very sparsely hairy except for a small patch of trichomes at the base; bright orange; anther cap generally white . . . . . **C. uniflos**

Acknowledgements

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Fig. 3. ***Cadetia taylori***, Hann Tableland, May 2010 (*Mathieson MTM827 & Forster*). Photograph: M.T.Mathieson

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Trichosanthes odontosperma W.E.Cooper & A.J.Ford (Cucurbitaceae), a new species from Queensland's Wet Tropics

W.E.Cooper[1] & A.J.Ford[2]

Summary

Cooper, W.E. & Ford, A.J. (2010). *Trichosanthes odontosperma* W.E.Cooper & A.J.Ford (Cucurbitaceae), a new species from Queensland's Wet Tropics. ***Austrobaileya* 8(2): 125–131.** *Trichosanthes odontosperma* W.E.Cooper & A.J.Ford is described and illustrated. Notes on habitat, distribution, and conservation status are provided.

Key Words: Cucurbitaceae, *Trichosanthes*, *Trichosanthes odontosperma*, *Trichosanthes* section *Edulis*, Australia flora, Queensland flora, new species

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Introduction

Trichosanthes L. (Cucurbitaceae) is a genus of approximately 100 species of vines, distributed from India and China to Australia and the eastern Pacific (Rugayah & de Wilde 1999). Currently six species of *Trichosanthes* are recorded for Australia (Telford 1982; Harden 1990; Cooper & Cooper 2004), with four species being considered endemic: *Trichosanthes pentaphylla* F.Muell. ex Benth., *Trichosanthes subvelutina* F.Muell. ex Cogn., *Trichosanthes holtzei* F.Muell. and *Trichosanthes odontosperma* described herein. *Trichosanthes* species occur in tropical and subtropical vegetation, primarily rainforest, monsoon forest, vine thickets and sparsely vegetated rocky outcrops.

Trichosanthes is placed in the subfamily *Cucurbitoideae* Endl., tribe *Trichosantheae* C.Jeffrey and subtribe *Trichosanthinae* Pax (Jeffrey 2005; Kocyan *et al.* 2007). The subtribe *Trichosanthinae* contains only one additional genus, *Gymnopetalum* Arn., which has four species distributed from India to China and Malesia. These two genera can be distinguished by the presence or absence of corolla fringes and overall shape of the folded petals in mature bud (de Wilde & Duyfjes 2006). In addition, the morphology and presence of probracts within *Trichosanthes* has been shown to be an important taxonomic feature (Duyfjes & Pruesapan 2004), which has not been previously reported for Australian species. A revision of Australian species of *Trichosanthes* is currently in progress (Cooper & de Boer, unpublished).

The species described below as *Trichosanthes odontosperma* has been known as *Trichosanthes* sp. A (Telford 1982), *Trichosanthes* sp. (Mt Lewis) (Cooper & Cooper 1994; Cooper & Cooper 2004) and *Trichosanthes* sp. (Mt Lewis B.Gray 167) (Hyland *et al.* 2003; Edginton 2007). The flowers open at night and have mostly shrivelled and disintegrated by early morning, making collections of quality material problematic. Furthermore, this species (like most *Trichosanthes*) is dioecious, with female flowers being particularly difficult to procure. Accordingly, a paucity of suitable collections with adequate duplicates until now has probably led to a lack of enthusiasm for describing this taxon.

Materials and methods

The study is based upon the examination of herbarium material from BRI, CANB, CNS and NSW with field observations by the first author. All specimens cited have been seen by one or both authors. Length and width dimensions are indicated as length × width followed by the measurement unit.

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Flowers do not usually occur in abundance, appearing mostly in ones and twos, therefore for this study collections from the same plant were made over a few weeks to gather enough material for an adequate description. Measurements of the floral parts and fruits are based on material preserved in 70% ethanol as well as fresh material from the field. Abbreviations in the specimen citations are: L.A. (Logging Area) and S.F.R. (State Forest Reserve). The abbreviation RE in the distribution and habitat notes refers to Regional Ecosystem, descriptions of which can be viewed at www.derm.qld.gov.au/wildlife-ecosystem/biodiversity/regional_ecosystems/index.php

Taxonomy

Trichosanthes odontosperma W.E.Cooper & A.J.Ford, **species nova** a *T. subvelutina* F.Muell. ex Cogn., probracteis linearibus, foliis glabris vel glabrescentibus, bracteis racemorum masculorum 3–4 mm longis, receptaculitubo florum masculorum et feminearum abaxialiter glabro vel glabrescenti, fructibus aurantiacis vel rubris, et seminibus lobatis dentatisque differt. **Typus:** Queensland. Cook District: Westcott Road, Topaz, 15 April 2009, *W.E.Cooper 2065* (holo: CNS [2 sheets + spirit] [7 sheets to be distributed to BRI, CANB, DNA, L, MO, NSW & UPS).

Trichosanthes sp. A (Telford 1982: 196).

Trichosanthes sp. (Williams 1987: 306; Jones & Gray 1988: 350).

Trichosanthes sp. (Mt Lewis) (Cooper & Cooper 1994: 610; Cooper & Cooper 2004: 144).

Trichosanthes sp. (Mt Lewis BG 167) (Hyland *et al.* 2003).

Trichosanthes sp. (Mt Lewis B.Gray 167) (Edginton 2007: 54).

***Illustrations*:** Cooper & Cooper (1994: 291), as *Trichosanthes* sp. (Mt Lewis); Cooper & Cooper (2004: 145), as *Trichosanthes* sp. (Mt Lewis); Hyland *et al.* (2003), as *Trichosanthes* sp. (Mt Lewis BG 167); Jones & Gray (1988: 354 & back cover), as *Trichosanthes* sp.; Williams (1987: 307), as *Trichosanthes* sp.

Dioecious trailing vine or liana to mid-canopy with stems to 3 cm diameter at base, perennial, partially or completely seasonally senescent. Stems and young branchlets 5-angular, glabrescent with minute multicellular trichomes clustered at nodes; bark fissured and corky on older growth; nodes often markedly swollen. **Probracts** on nodes beside petioles, caducous, linear or narrowly ovate, minutely lobed or with a few teeth, 3–13 × 1–3 mm, glandular, glabrous or glabrescent. **Tendrils** arising beside petiole, unbranched or 2- or 3-branched. **Leaves** simple, alternate, petiolate, discolorous, glabrous or glabrescent; petiole 20–95 mm long; lamina ovate, cordate or triangular, unlobed or rarely 3-lobed, 50–190 × 41–160 mm, leathery, base cordate or rarely hastate, sinus mostly narrow and deep; apex acuminate to acute, with or without a soft mucro; margin denticulate with 13–27 teeth per side; upper side smooth, glabrous or with sparse, minute, translucent-white multicellular trichomes on main veins; numerous small, translucent and sunken multicellular (rosette-shaped) cystoliths, which in most dried specimens become black and flush or slightly protruding; midrib flush in fresh specimens and slightly sunken when dried; underside with sparse, minute, translucent-white multicellular trichomes on main veins, 1–16 circular and flat glands on each side of the leaf base; primary lateral veins usually 3 on each side of midrib, at 45–75° to the midrib; intralateral veins reticulate. **Inflorescence** arising beside petiole, solitary, in pairs or racemose; flowers unisexual, epigynous, fragrant, 4 or mostly 5-merous, actinomorphic. **Male flowers** mostly solitary, rarely a fascicle of two flowers or a raceme beside a solitary flower, 45–90 mm diameter; bracts narrowly ovate, glabrous, 5–17 × 1–3 mm, at the base of racemose flowers; peduncle 35–110 mm long; pedicel 43–83 mm long. Receptacle tube green or creamy-green with a narrow bright yellow centre, adaxial surface of tube yellow, 45–90 mm long, salverform, glabrous or glabrescent abaxially; sepals usually 5 (rarely 4), free, green, triangular, entire or with 1–3 teeth, glabrous or glabrescent, 8–20 × 2–4 mm; petals 5 (rarely 4), fused, white, obdeltoid, length including fimbriations 27–40 × 24–40 mm,

both surfaces villous becoming glabrescent towards apex; fimbriations simple or forked, up to 16 mm long. Stamens 3, included, free until anthesis, becoming connate, filaments 2–5 mm long, glabrous; anthers oblong, s-shaped, 8–11 mm long, two bilocular and one unilocular, basifixed. **Female flowers** solitary, 60–73 × 55–65 mm; peduncle 31–50 mm long, bracts absent. Receptacle tube green or creamy-green with a narrow bright yellow centre, adaxial surface of tube yellow, 39–55 mm long, salverform, glabrous or glabrescent abaxially; sepals 5, green, triangular, entire, glabrous or glabrescent, 5–12 × 1–2 mm; petals 5, white, obdeltoid, 28–31 mm long, both surfaces villous, fringe glabrescent; style *c.* 25 mm long. Stigma bifid, *c.* 6 mm long. Ovary 14–24 mm long, glabrous and 10-ribbed externally; ovules numerous, in (vertical) longitudinal rows, *c.* 1 mm long. **Fruit** a pepo or berry, ovoid or ellipsoid, apex beaked, 90–140 × 60–90 mm, glabrous, longitudinally 10-ribbed, orange to red; peduncle 25–40 (or more, based upon flowering specimens) mm long, 4–10 mm wide; mesocarp yellow-orange, firm, 10–13 mm thick; seeds numerous, quadrangular, suspended in orange or red pulp, 1-celled, 2-horned at one end, 4-lobed at the other end, both sides with 2 rows of 2–10 teeth, 12–18 mm long, 6.3–7.7 mm wide, 3–4 mm thick; testa brown to blackish; endosperm absent; radicle *c.* 1mm long, much shorter and narrower than the cotyledons. Germination epigeal (phanerocotylar); cotyledons elliptic, 14–23 × 6–9 mm. *Rainforest gourd.* **Fig. 1.**

***Additional selected specimens (from 34 examined)*: Queensland.** Cook District: Adeline Creek Road, Oct 1993, *Le Cussan 238* (CNS); Mt Lewis, May 1975, *Gray 167* (CNS); S.F.R. 143, Windmill L.A., Feb 1976, *Hyland 8607* (CNS); 4.5 km from Whyanbeel on track to Stewart Creek, 13.7 km NW of Mossman, Nov 1988, *Jessup et al. GJM 508* (BRI); S.F.R. 194, Western, Cpt 55, Oct 1991, *Hyland 14275* (CNS); Tinaroo Range, Downfall Creek Road, Feb 1962, *Webb 5757* (BRI); Kennedy Road, junction with Kennedy Highway, Mar 2000, *Gray 7804* (CNS); Stockwellia Track, May 1996, *Jensen 766* (CNS); Swipers L.A., S.F.R. 310, Aug 1981, *Gray 20187V* (CNS); Topaz N.P., April 2009, *Cooper 2066* (CNS); Westcott Road, Topaz, Jan 1992, *Cooper 151* (CNS); *loc. cit.*, Jun 1999, *Cooper 1240* (CNS); *loc. cit.*, Jun 1999, *Cooper 1255* (CNS); *loc. cit.*, Apr 2009, *Cooper 2058* (CNS); Towalla, Oct 1994, *Cooper 844* (CNS); Near junction of Dirran River and Millaa Millaa railway line, Mar 1945, *Thurston 640* (CNS); 22 km south of Atherton on road to Ravenshoe, April 2002, *Bean 18909* (BRI); S.F.R. 755, North Johnstone L.A., Nov 1977, *Dockrill 1406* (CNS); S.F.R. 650, Mt Fisher, Oct 1978, *Gray 1044* (CNS); Tully Falls, Dec 1947, *Fielding Cairns 1* (CNS). North Kennedy District: S.F.R. 605, Culpa Road, 3.7 km from O'Leary Creek Bridge, site 53, May 2002, *Ford 3382 & Holmes* (BRI, CNS).

***Distribution and habitat*:** *Trichosanthes odontosperma* is endemic to the Wet Tropics bioregion in north-eastern Queensland, where it is currently known to occur from the Windsor Tableland area, west of Cape Tribulation, to the Cardwell Range, west of Tully (**Map 1**). It inhabits predominantly wetter and more mountainous notophyll or mesophyll vineforests/rainforests on soils derived from basalt, rhyolite, mudstones and granite. Although it occurs over a wide geographical area, common canopy species throughout most of its range include: *Argyrodendron peralatum* (F.M.Bailey) Edlin ex Boas, *Beilschmiedia bancroftii* (F.M.Bailey) C.T.White, *Cardwellia sublimis* F.Muell., *Cryptocarya mackinnoniana* F.Muell., *Cryptocarya oblata* F.M.Bailey, *Doryphora aromatica* (F.M.Bailey) L.S.Sm., *Endiandra montana* C.T.White, *Ficus pleurocarpa* F.Muell., *Flindersia brayleyana* F.Muell., *Franciscodendron laurifolium* (F.Muell.) B.Hyland & Steenis, *Syzygium gustavioides* (F.M.Bailey) B.Hyland and *Sloanea macbrydei* F.Muell. Common small trees and shrubs throughout most of its range include: *Apodytes brachystylis* F.Muell., *Atractocarpus hirtus* (F.Muell.) Puttock, *Delarbrea michieana* (F.Muell.) F.Muell., *Gossia dallachiana* (F.Muell. ex Benth.) N.Snow & Guymer, *Rockinghamia angustifolia* (Benth.) Airy Shaw and *Wilkiea angustifolia* (F.M.Bailey) J.R.Perkins.

Trichosanthes odontosperma appears to be favoured by disturbance, and is frequently seen on rainforest margins and in tree-fall gaps, especially on soils derived from basalt. Altitudinal range is 60–1160 m, although there appears to be a preference between 600 m and 1000 m.

Trichosanthes odontosperma has been recorded or reliably reported in the following regional ecosystems (REs): 7.3.36a (rarely), 7.8.1a (rarely), 7.8.2a (commonly), 7.8.4a (commonly), 7.8.4c (rarely), 7.11.1a (rarely), 7.11.12a (rarely) and 7.12.16a (commonly).

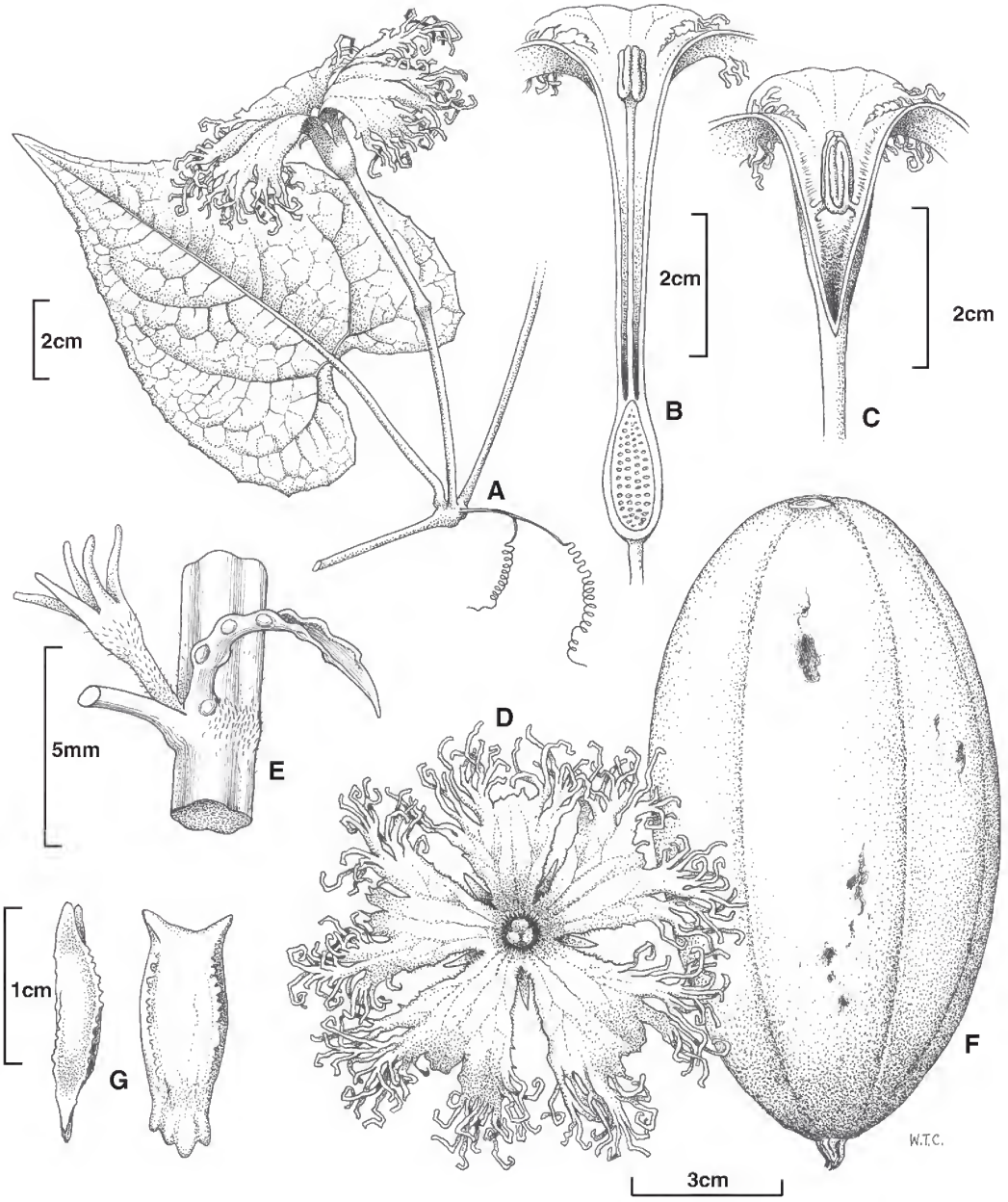

Fig. 1. ***Trichosanthes odontosperma***. A. flowering node (male plant) with mature leaf and tendril. B. female flower lateral view longitudinal section. C. male flower lateral view longitudinal section showing s-shaped anthers. D. male flower face view. E. glandular probract and immature flower bud. F. fruit lateral view. G. lateral view of seed (left), adaxial view of seed (right). Scales as indicated. A, C, D, E *Cooper 2065* (CNS); B *Cooper 2067* (CNS); F, G *Cooper 844* (CNS). Del. W.T.Cooper.

***Phenology*:** Flowers have been recorded in all months; fruits have been recorded in January, March, April, June, July, August, October and November.

***Notes*:** The flowers of *Trichosanthes odontosperma* open during the evening and before they unfurl are commonly visited by numerous small scuttleflies belonging to the family Phoridae (**Fig. 2**). The flowers smell strongly of sweet coconut and the flies are often still on them as they disintegrate. In warm weather, this occurs during the following morning. In cool wet weather the flowers may remain on the plant in reasonable condition for about 24–36 hours. Stems are usually leafless and dying when ripe fruits are present.

***Affinities*:** *Trichosanthes odontosperma* belongs in *T.* section *Edulis* Rugayah along with eight other species from New Guinea (Rugayah & De Wilde 1999) and is the only Australian representative of this section. *Trichosanthes* section *Edulis* is distinguished from the other four sections

Fig. 2. Male flowers of *Trichosanthes odontosperma* being visited by scuttleflies (Phoridae).

in the genus by the combination of dioecy, presence of probracts, red fruit pulp, and seed morphology (quadrangular and notched or toothed) (Rugayah & de Wilde 1999). Within Australia, the flowers of *T. odontosperma* are most similar to *T. subvelutina* from section *Foliobracteola* Cheng & Yueh (Rugayah & De Wilde 1999). *T. subvelutina* is endemic to southeast Queensland and northeast New South Wales and has persistent, ovate, quadrate or broadly triangular probracts, pubescent or hirsute leaves and receptacle-tube, greenish-white fruit pulp and seeds with entire margins. Bracts on male racemes of *T. subvelutina* are 19–33 mm long compared with 5–17 mm long in *T. odontosperma.*

***Conservation status*:** Most existing collections of *Trichosanthes odontosperma* have been made within the World Heritage Area of the Wet Tropics. *T. odontosperma* has been collected in Daintree, Maalan, Wooroonooran and Tully Falls National Parks. The extent of occurrence is estimated to be no less than 2390 km^2 and occurs over a large, but narrow, geographical area. Accordingly it is not considered at risk or under threat at this time.

***Etymology*:** The specific epithet is derived from the Greek, *odonto* (tooth) and *-sperma* (seed) and refers to the toothed seeds, distinguishing it from all other Australian *Trichosanthes.*

Acknowledgements

The first author thanks Frank Zich and Darren Crayn for support and access to CNS herbarium, Bill Cooper for the illustrations, Lyn Craven (CANB) for the translation of the diagnosis into Latin. Hugo de Boer and Frank Zich provided useful comments on an earlier manuscript. Peter Bostock provided the distribution map and Christine Lambkin (Queensland Museum) kindly identified the flies. Loans from BRI, CANB and NSW were greatly appreciated. Permits to collect in the Wet Tropics were issued by the Queensland Department of Environment and Resource Management. The second author acknowledges this work has been partly funded through the Australian Government's Marine and Tropical Sciences Research Facility.

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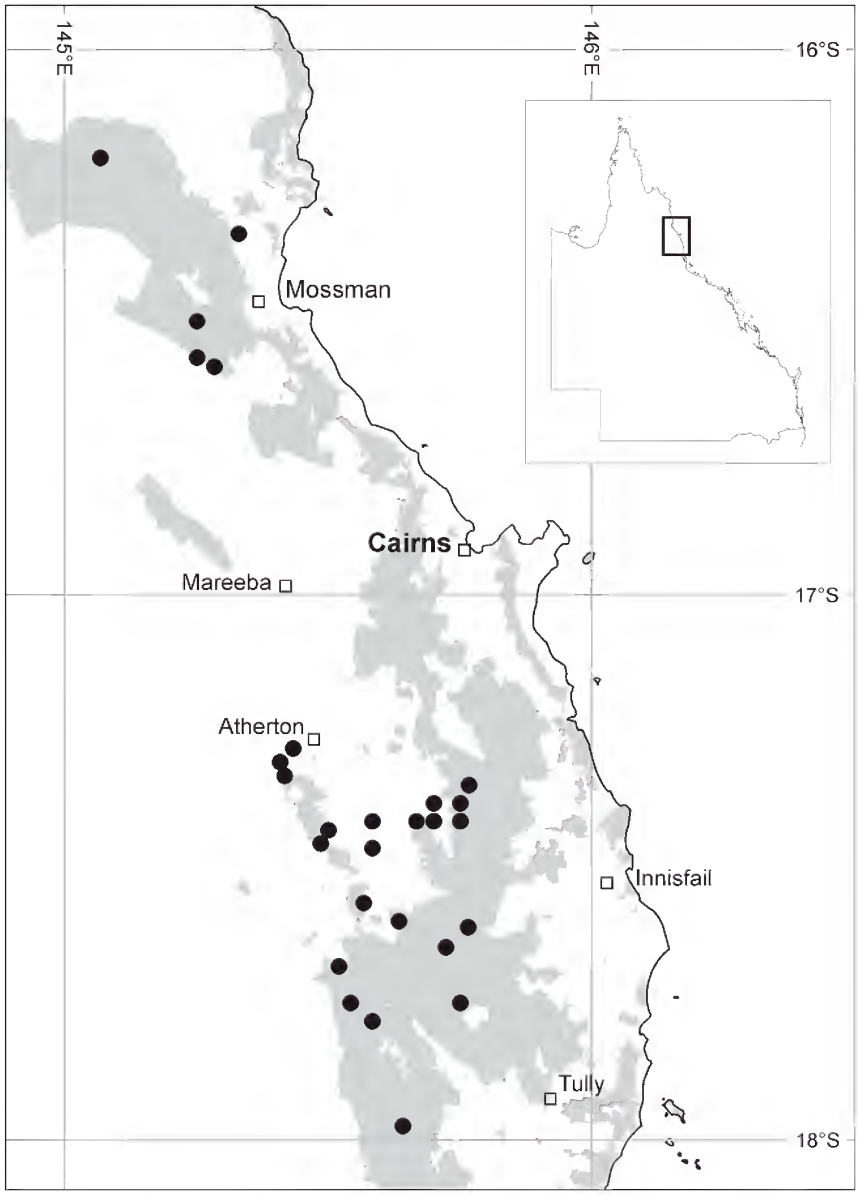

Map 1. Distribution of *Trichosanthes odontosperma* (●) in north-east Queensland. Shaded area on map indicates nature conservation reserves (National Parks, Forest Reserves and Conservation Parks).

Book Review

Australian Palms – biogeography, ecology and systematics. J.L.Dowe (2010). CSIRO Publishing: Melbourne. Softcover, 290 pp, numerous colour photographs and black & white illustrations. ISBN 9780643096158. $140.00 AUD.

Palms are often the bane of botanists and others that wish to identify and collect them for botanical specimens. They are quite easily (along with pandans) the most difficult plants to process to produce anything meaningful for herbaria and those that use them. Despite their paucity in the Australian flora (only 60 species in 21 genera), their identification has not always been straight forward and this is often compounded when plants are cultivated alongside similar, but exotic species.

John Dowe has had a research interest in palms for many years, producing a number of revisions of genera such as *Archontophoenix* and *Livistona*. He has also studied them in numerous locations in New Guinea and the islands of the Pacific. This academic approach to palms has meant that this comprehensive overview is well researched and far from superficial.

The bulk of the book is a standard morphological description of the Australian palms, presented in a formal taxonomic format with citation of type specimens, a detailed description and notes on typification, etymology, distributon and ecology and other points of interest. Each species is illustrated with colour photographs of the plants in habitat, together with photographs of flowers, fruit and leaf details. A photograph of the type specimen (a single sheet only, not including multiple sheet types or carpological material) is also included. A generalised map of Australia with dots of distribution records is provided for each species.

Prior to the taxonomic section, there are a number of general chapters. The early documentation of Australian palms is covered briefly and includes brief biographies of botanists significant for their classification or taxonomy. The historical biogeography of palms is a general chapter with particular reference to Australia and covers fossils, climate change over time and the connection with New Guinea. Distribution and ecology of Australian palms is extensively reviewed with sections on environments, place in the landscape, phytogeographical regions, distribution patterns, remote distributions, soils, fire, climate, demography, population dynamics and genetics. This is followed by a systematic arrangement of Australian palms following recent molecular driven phylogenies for the group as a whole.

The taxonomic section is arranged in palm subfamilies with keys to genera, followed by keys to species where relevant.

The book ends with chapters on doubtful or excluded names, a field identification key to all species, a checklist of genera and species, glossary, list of references and index.

Overall this is an excellent book. In nearly all instances the data and information incorporated is right up to date, although documentation of distributions moves on and an easy example is for *Linospadix apetiolata*, now known to be more widespread in the Wet Tropics than indicated here. Unlike the book on rainforest pollination reviewed elsewhere in this journal, this time around the references are formally cited in the text and easily found in the bibliography. I would have liked to have seen a guide to collecting herbarium specimens included as few botanical collectors know how to do this properly. It reminds me of the advice traditionally offered on this topic, namely that you selected the palm of interest, then cut it down (or perhaps some lackey did this task?), prior to making the appropriate specimen (Womersley 1981). Hopefully this book will prevent too many tall *Hydriastele costata* being collected in this way and the often important local dominance of palms in certain plant communities can be appreciated and documented more often.

Why CSIRO Publishing chose to produce this book with a paper thin soft cover eludes me. With little to no use, this worthless cover is already curling and any field use will see it disintegrate within days. Hopefully they might correct this and reissue a very worthwhile reference book in a hardcover version.

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Paul I. Forster, Queensland Herbarium.

Citrus wakonai P.I.Forst. & M.W.Sm. (Rutaceae), a new species from Goodenough Island, Papua New Guinea

Paul I. Forster[1] & Malcolm W. Smith[2]

Summary

Forster, P.I. & Smith, M.W. (2010). *Citrus wakonai* P.I.Forst. & M.W.Sm. (Rutaceae), a new species from Goodenough Island, Papua New Guinea. ***Austrobaileya* 8(2): 133–138.** A new species of *Citrus* is described and illustrated and its putative relationships discussed. *Citrus wakonai* is known from Goodenough Island, Milne Bay Archipelago in Papua New Guinea where it is a small understorey tree up to 6 m tall. It provides small edible fruit, but currently lacks potential as a source of new rootstocks or germplasm for the citrus industry due to viral susceptibility.

Key Words: Rutaceae, *Citrus*, *Citrus australasica*, *Citrus garrawayi*, *Citrus wakonai*, *Citrus warburgiana*, Papua New Guinea flora, taxonomy, nomenclature, new species

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Introduction

The genus *Citrus* L. occurs in Asia (China), Malesia (including Papua New Guinea [PNG]) and Australia and is now considered to incorporate the genera *Clymenia* Swingle, *Eremocitrus* Swingle, *Feroniella* Swingle, *Fortunella* Swingle, *Microcitrus* Swingle, *Oxanthera* Montrouz. and *Poncirus* Raf. (Bayer *et al.* 2009). Eight or nine species have been recognised for the combined land masses of New Guinea (four or five species when species formerly classified in *Clymenia* and *Microcitrus* are excluded) and Australia (six species when species formerly classified in *Eremocitrus* and *Microcitrus* are included). Most of these taxa have been considered endemic to one land mass or the other, with only *C. garrawayi* F.M.Bailey considered as shared between the two (Forster 1991; Mabberley 1998).

The 1991 identification of *Citrus garrawayi* from fragmentary PNG material collected by Len Brass in 1953 on the 4th Archbold Expedition and held at the Queensland Herbarium, was primarily based upon similarities in leaf morphology between this material and Australian collections of that species. This same material had previously been erroneously referred by Stone (1985) to *C. australasica* F.Muell., a species restricted to south-eastern Queensland and north-eastern New South Wales. The habitats where Brass collected his material on Goodenough Island in the Milne Bay Archipelago are dissimilar to those in Queensland where *C. garrawayi* occurs due to greater elevation and different geology and vegetation community composition (see Brass [1956] for a general vegetation description). Hence, collection of complete material from Goodenough Island was considered a priority, not only to resolve its taxonomic identity, but to trial this genetic diversity for a *Citrus* breeding and rootstock development program at Bundaberg.

In September 2000 Malcolm Smith visited Goodenough Island, and using Brass's original field notes (held in the Queensland Herbarium archives) and the assistance of local villagers from Wakonai was able to relocate the *Citrus* populations collected by Brass. Several plants were located with ripe fruit and fresh seed. Some of these seed were imported into Australia and grown to maturity at the Bundaberg Research Station. Examination

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of live material in habitat, together with that grown in Australian cultivation has revealed a number of morphological differences between this and material of other *Citrus* species from Australia and PNG. These populations from Goodenough Island are described here as the new species *Citrus wakonai.*

Materials and methods

The data and description in this paper are based on live and subsequent dried or pickled material of Australian and PNG *Citrus* species held at the Queensland Herbarium (BRI). Information on Brass holdings of PNG *Citrus* in the Harvard University herbaria was provided by that institution in March 2007. Length and width dimensions are indicated as length × width followed by the measurement unit.

Taxonomy

Citrus wakonai P.I.Forst. & M.W.Sm., ***species nova*** differt a *C. warburgiana* stipulis lanceolatis eumorphis (non obsoletis); folii lamina lanceolato-trullata apice acuminato (in illa lanceolato apice acuto usque obtuso); fructibus plus quam duplo longioribus, obovoideis, externe flaveolis, succis vesiculis flaveolis maturitate (in illa globosis, externe viridibus, succis vesiculis pallide viridibus maturitate). **Typus:** Papua New Guinea. Milne Bay Province: Utamodi Valley, southwest of Wakonai Village, Goodenough Island (*ex situ* cultivated at Bundaberg), 30 September 2008, *M.W.Smith 09Q005* (holo: BRI [3 sheets + spirit]; iso: CNS, LAE).

Citrus australasica auct. non F.Muell.; Stone (1985: 226).

Citrus garrawayi (as '*garrawayae*') *auct. non* F.M.Bailey; Forster (1991: 357), Mabberley (1998: 338).

Tree to 6 m tall, bark somewhat corky, cream; branches somewhat weak and straggling; often coppicing and suckering from base; indumentum of simple, weakly hooked, antrorse trichomes, fawn to uncoloured; most vegetative organs with copious oil glands. Leafy twigs terete, 1–2 mm diameter, axillary spines solitary, 3–5 mm long; stipules lanceolate, 0.8–1 × 0.5–0.7, marginally ciliate. Leaves 18–65 mm long, glossy; petioles 2–5 × 0.8–1 mm, marginate to winged – the latter obdeltoid towards the lamina base, very weakly articulated at base of leaf lamina, indumentum sparse; lamina lanceolate-trullate, 15–60 × 7–26 mm, dark green above, paler green below, margins crenate-dentate with 17–22 teeth per side of midrib (often with secondary teeth); venation barely visible above, prominent below with 1° midrib and 2° laterals raised, 3° and 4° interlaterals weakly developed; tip acuminate, apically notched due to teeth, base acute; indumentum restricted to lower surface on 1° and 2° veins, scattered. Inflorescence of solitary flowers, or 2 or 3 in a small fascicle; peduncle ± obsolete or short and up to 2 mm long, indumentum scattered; bracts variable, lanceolate to linear, 1–2 × 0.2–0.3 mm, few apical or marginal cilia. Flowers 6–7 mm long, 10–12 mm diameter; pedicels short, 1–2 × 0.8–1 mm, glabrous; calyx cupular, sepals 5, orbicular-ovate, 1.8–2 × 2–2.2 mm, slightly overlapping at margins and with marginal cilia; petals 5, reflexed at anthesis, ecucullate, lanceolate, 7–7.5 × 2.8–3 mm, white, apex acute; stamens 18–20, filaments 3–5 × *c.* 0.3 mm, anthers 1–1.2 × 0.7–0.8 mm; disk very reduced, *c.* 2.5 mm diameter; pistil 5 or 6 ribbed, *c.* 2.3 mm long; ovary 5(–7)-locular, *c.* 3 × 2 mm, green. Fruit an hespiridium (modified berry), obovoid, 44–65 mm long, 22–25 mm diameter at widest point, 6–8 mm wide just above base, surface rough, irregular, yellow-green when mature; flesh dull, pale yellow, edible although rather tart, juice vesicles elongate-fusiform; 12–87 (average 46.3, sample size 60) seeds per hesperidium. Seeds somewhat turbinate, monoembryonic, entirely zygotic, 8–10 × 4–5 mm, with a distinct chalazeal spot, fawn. **Fig. 1.**

***Additional specimen examined*: Papua New Guinea.** Milne Bay Province: Goodenough Island, Oct 1953, *Brass 24925* (BRI).

***Distribution and habitat*:** *Citrus wakonai* occurs as an understorey treelet in rainforest (complex mesophyll vineforest) at altitudes between 900 and 1500 m. The geology of Goodenough Island is complex due to ongoing and relatively recent, uplift and shearing; however, it is probable that the locality visited has substrates overlying leucogneiss (altered metamorphic rocks) (Davies & Warren 1992;

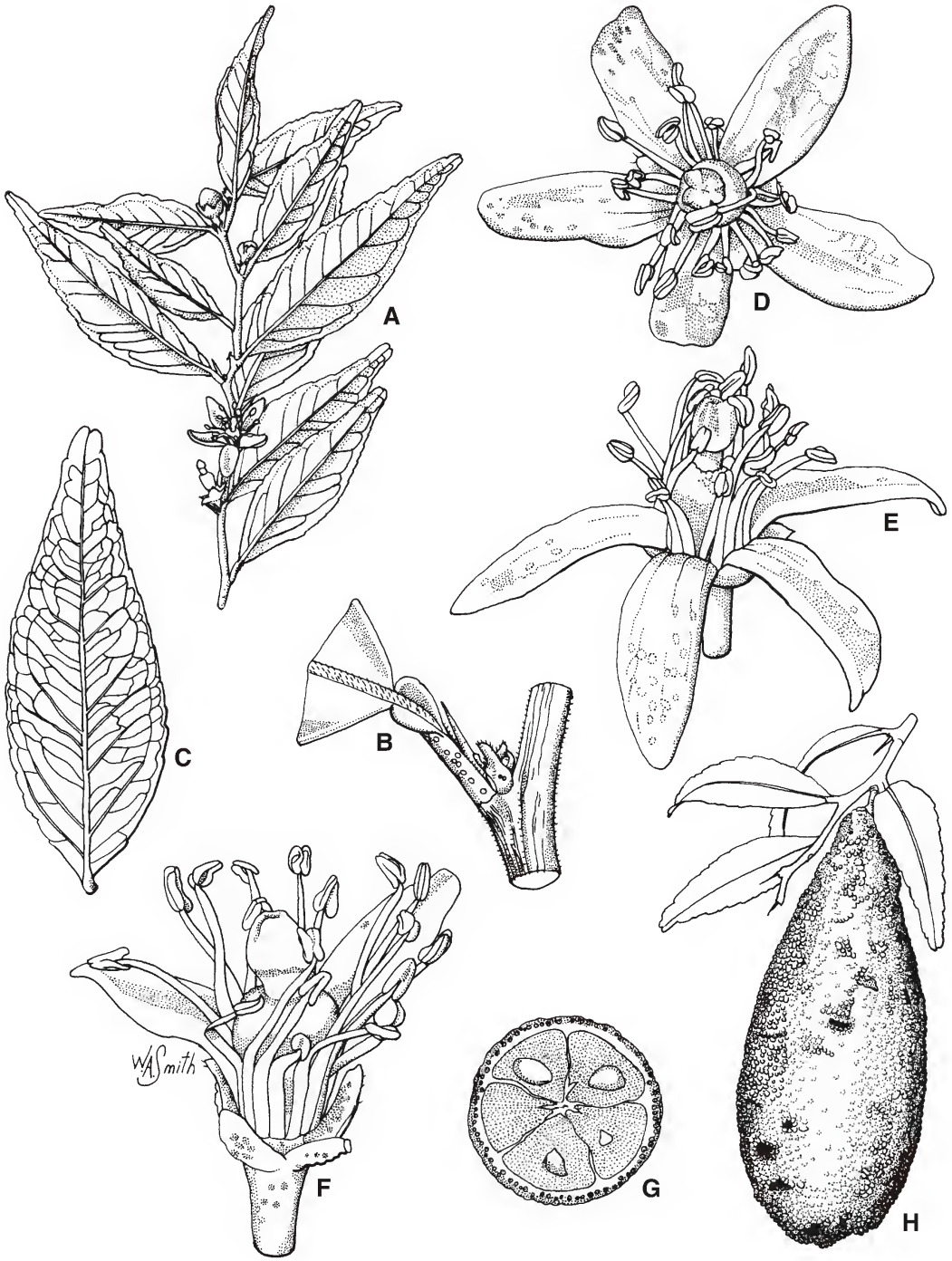

Fig. 1. ***Citrus wakonai***. A. habit of flowering branchlet × 1. B. node showing stipule and base of leaf lamina with obdeltoid margin on the petiole × 5. C. undersurface of leaf lamina showing 1–3° venation × 1.5. D. face view of flower × 5. E. side view of flower × 5. F. side view of flower with petals removed to show disposition of stamens and sepals × 6. G. cross-section of fruit showing five compartments and embedded seeds × 1. H. branchlet with fruit in natural disposition × 1. All from *Smith 09Q005* (BRI). Del. W.Smith.

Hill 1994). The vegetation community where this species occurs was described by Brass (1956) as a "transition mid-mountain forest and rain forest. A scattering of two species of oak and one of *Castanopsis* occurred with species of *Terminalia*, *Sloanea*, *Gordonia*, *Podocarpus* near *neriifolius*, and other trees…in a mixed forest in which the larger trees were fully 35 metres tall and of good, big diameter". Annual rainfall at nearby Bolu Bolu is approximately 1800 mm with almost 40% occurring during the summer months; however, Bolu Bolu is at sea level and it is likely that rainfall in the adjacent mountainous areas is considerably higher.

***Notes*:** *Citrus wakonai* appears to be most closely related to those species that were once placed in *Microcitrus*. The new species has some superficial similarities both to *C. australasica* and *C. garrawayi*, the two species with which it has been previously confused, although it is markedly disjunct from both. *Citrus wakonai* and *C. australasica* are immediately distinguished by the former with leaf lamina lanceolate-trullate with many teeth (>15 per side) and obovoid fruit and the latter with leaf lamina obovate, ovate or obdeltoid with few marginal teeth (<10 per side) and the fruit oblong-cylindrical to somewhat fusiform.

The juvenile foliage of *Citrus garrawayi* is markedly dimorphic and much smaller in size than when the plants mature. In comparison, the juvenile foliage of *C. wakonai* is not markedly dimorphic, mainly differing only in size (being smaller). Mature foliage of *C. garrawayi* is elliptic to ovate or more rarely obovate, with few marginal teeth (<10 per side) (versus lanceolate-trullate and with 17–22 teeth per side) and the flower petals are cucullate (versus not). Mature fruit of *C. garrawayi* are always ovoid to oblong-cylindrical and at maturity green in colour with pink flesh, whereas those of *C. wakonai* are obovoid and at maturity are dull yellow-green with yellow flesh.

Citrus wakonai is distinct from both *C. australasica* and *C. garrawayi* in the fruit juice-vesicles being elongate-fusiform rather than subglobose.

Citrus wakonai differs from the other two species formerly referred to the genus *Microcitrus* that are endemic to PNG in its habit (small tree to 6 m versus shrub to 2.5 m in *C. wintersii* Mabb. and larger tree to 12 m in *C. warburgiana* F.M.Bailey), the well developed stipules that are marginally ciliate (much reduced in *C. wintersii* and ± obsolete in *C. warburgiana*), the lanceolate-trullate leaf lamina with an acuminate tip (linear to narrow-elliptic with an obtuse tip in *C. wintersii* and lanceolate with an acute to obtuse tip in *C. warburgiana*) and the obovoid fruit shape (fusiform-cylindrical in *C. wintersii* [Winters 1976] and globose in *C. warburgiana*).

In general foliar appearance, *Citrus wakonai* is superficially similar to *C. warburgiana*, particularly with regards to the extremes of leaf lamina shape. Further differences between the two species are the former with less pronounced leaf margin crenulations (versus more pronounced), the petiole margin sometimes (both usually have petioles that are marginate with the margins forming a channel) well developed and obdeltoid towards the lamina base (versus linear) and the pale yellow juice-vesicles at fruit maturity (versus lime green).

Populations of the two species are only approximately 70 km distant from one another, albeit with sea inbetween. The D'Entrecasteaux Islands (part of the Milne Bay Archipelago), of which Goodenough and Fergusson are the largest, are thought to be of recent origin, only emerging from the sea in the last 2 million years (Hill 1994). Hence, it is most likely that *C. wakonai* and *C. warburgiana* have diverged from *Citrus* progenitors present on mainland PNG in the recent past when sea levels were lower (Hall 2002). The flora of the Milne Bay Archipelago is little explored and described, but like much of PNG is rich in endemics with at least 239 known (Johns *et al.* 2009) of which *Acronychia normanbiensis* T.G.Hartley (known only from Normanby Island) (Hartley 1974) and *Melicope sudestica* T.G.Hartley (known only from Sudest Island) (Hartley 2001) are from the Rutaceae.

Citrus wakonai can be hybridised with *C. australis* (A.Cunn. ex Mudie) Planch., *C. australasica*, *C. garrawayi*, *C. glauca* (Lindl.) Burk., *C. inodora* F.M.Bailey, *C. reticulata* Blanco, *C. sinensis* Osbeck, *C. warburghiana* and *C. wintersii*, and the resulting plants are fertile. It hybridises less readily with *Poncirus trifoliata* (L.) Raf. (often now included in *Citrus* on molecular evidence [Mabberley 2004; Bayer *et al.* 2009]) with the resultant progeny weak and dying shortly after germination. *Citrus warburgiana* grouped with the Australian *C. inodora* in the molecular tree of Bayer *et al.* (2009); hence, it is likely that *C. wakonai* may also belong to this part of the *Citrus* clade.

Citrus wakonai has the shortest juvenile period known of any *Citrus* species and can flower in as little as 144 days after germination. This is even shorter than that reported for *C. wintersii* which has been reported to flower and fruit within one year of sowing (Winters 1976). In populations of both species cultivated at Bundaberg, it was found that *C. wakonai* consistently commenced flowering at five months of age, whereas *C. wintersii* generally took 14 months. The short juvenile period of *C. wakonai* is transferred to its hybrid progeny, since some hybrids with mandarin (*C. reticulata*) have flowered within 12 months of sowing.

The species is highly sensitive to citrus tristeza virus (family Closteroviridae, genus *Closterovirus*) and field-grown trees exposed to aphid transmission develop stem pitting symptoms and die within a few years of planting. Similarly when used as a rootstock for cultivated citrus, trees quickly become unhealthy and many die (Smith *et al.* 2008). Consequently *Citrus wakonai* appears to have limited potential as a rootstock for commercial citrus crops.

***Etymology*:** The species epithet recognises the local people from the village Wakonai on Goodenough Island, upon whose traditional land this plant grows. The name should be considered as a non-declinable noun in apposition and is pronounced 'wŏkanī'.

This plant is known as "Kamakuku" by the local people; the same word is used by people on nearby mainland PNG to describe *Citrus warburgiana*.

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A new subspecies of *Eucalyptus sideroxylon* A.Cunn. ex Woolls (Myrtaceae) from Queensland

A.R.Bean

Summary

Bean, A.R. (2010). A new subspecies of *Eucalyptus sideroxylon* A.Cunn. ex Woolls (Myrtaceae) from Queensland. ***Austrobaileya* 8(2): 139–141.** A new subspecies, *Eucalyptus sideroxylon* subsp. *improcera* A.R.Bean, is described. It is diagnosed against the typical subspecies, and illustrations are provided. It is confined to a small area of the Barakula State Forest in southern Queensland.

Key Words: Myrtaceae, *Eucalyptus*, *Eucalyptus sideroxylon*, *Eucalyptus sideroxylon* subsp. *improcera*, taxonomy, Australia flora, Queensland flora, new subspecies

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Introduction

Eucalyptus sideroxylon A.Cunn. ex Woolls is a widespread species extending from northern Victoria to southern Queensland, occurring mostly on the western slopes of the Great Dividing Range. It is notable for its very hard, black ironbark on the trunk and larger branches, and for its often pink or red flowers.

An atypical and disjunct population of *Eucalyptus sideroxylon* in the Barakula State Forest (S.F.) near Chinchilla has been known since the 1970s. However, this population was not sampled by Bramwells & Whiffin (1984) in their study on morphometric variation in the species. It is here described at subspecific rank.

Materials and methods

The paper is based on examination of herbarium specimens at BRI, as well as observations made in the field. All measurements were made from dried material. Length and width dimensions are indicated as length × width followed by the measurement unit.

Taxonomy

Eucalyptus sideroxylon subsp. **improcera** A.R.Bean **subspecies nova** a subspecie typica differens alabastris longioribus latioribus, operculo hypanthio duplo breviore, statura minore et foliis adultis latis 3.5–5-plo longioribus quam latioribus. **Typus:** Queensland. Leichhardt District: Waaje Scientific Area, Barakula State Forest, NNW of Chinchilla, 25 March 2010, *A.R.Bean 29467* (holo: BRI; iso: CANB, MEL, NSW, *distribuendi*).

Eucalyptus sideroxylon subsp. (Waaje N.B.Byrnes 3955); Bean *et al.* (2007).

Tree to 6 metres high. Bark predominantly rough (persistent bark extending more than two-thirds plant height). Black ironbark persistent on trunk and larger branches, very hard and impregnated with kino. Smaller branches smooth, grey to white. Juvenile leaves alternate, ovate, dull, concolorous, 71–100 × 24–43 mm, apex obtuse or apiculate. Adult branchlets not pruinose. Adult leaves concolorous, dull, lanceolate or ovate, 80–125 × 22–35 mm, 3.5–5 times longer than wide, greyish green, apex acute to attenuate, base acutely cuneate; secondary veins >5 mm apart, at 30–60 degrees to midvein; vein reticulation moderately dense or dense, sometimes obscure; oil glands appearing as isolated islands in the vein areoles. Petioles 12–21 mm long. Inflorescence with umbels borne singly in leaf axils or along leafless stems. Individual umbels 7(–9)-flowered. Peduncle erect or pendulous in bud, terete, 9–20 × 1–1.5 mm wide; pedicel 6–12 mm long; mature buds obovoid, 11–14 × 7.5–8

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mm, not pruinose. Hypanthium obconical; operculum conical or patelliform, shorter than hypanthium, as wide as hypanthium; operculum scar absent. Stamens inflexed; anthers oblong, rigidly connected to filament, cells remaining separate. Staminodes present, with entire outer whorl sterile; flowers creamy-white. Style reaching underside of operculum in bud; stigma dilated (pin-head type). Fruiting peduncle erect or pendulous. Fruiting pedicel 6–12 mm long. Fruits cupular to ovoid-truncate, 9–11 × 9.5–11 mm, staminophore forming an annulus 1.5–2 mm wide, brown to black, eventually deciduous. Disc vertically or obliquely descending. Valves 5 or 6, tips enclosed below level of rim. Fertile seeds ovoid or depressed ovoid, 1.2–1.5 mm long, dark brown to black, smooth, finely reticulate, not ribbed or ridged; hilum ventral. **Fig. 1.**

***Additional specimens examined*: Queensland**. LEICHHARDT DISTRICT: Waaje Scientific Area, Barakula S.F., NNW of Chinchilla, Mar 2010, *Bean 29470* (BRI, MEL); Waaje, NW corner of Barakula S.F., May 1985, *Brooker 9010* (BRI, CANB); Barakula S.F., Waaje (near Quandong), Sep 1980, *Byrnes 3955* (BRI, CANB, NSW); Waaje wildflower area, Barakula S.F. 302, Jun 1994, *Grimshaw G769 & Turpin* (BRI, NSW); Waaje, NW corner of Barakula State Forest, N of Chinchilla, Jul 1995, *Young s.n.* (BRI [AQ582305]).

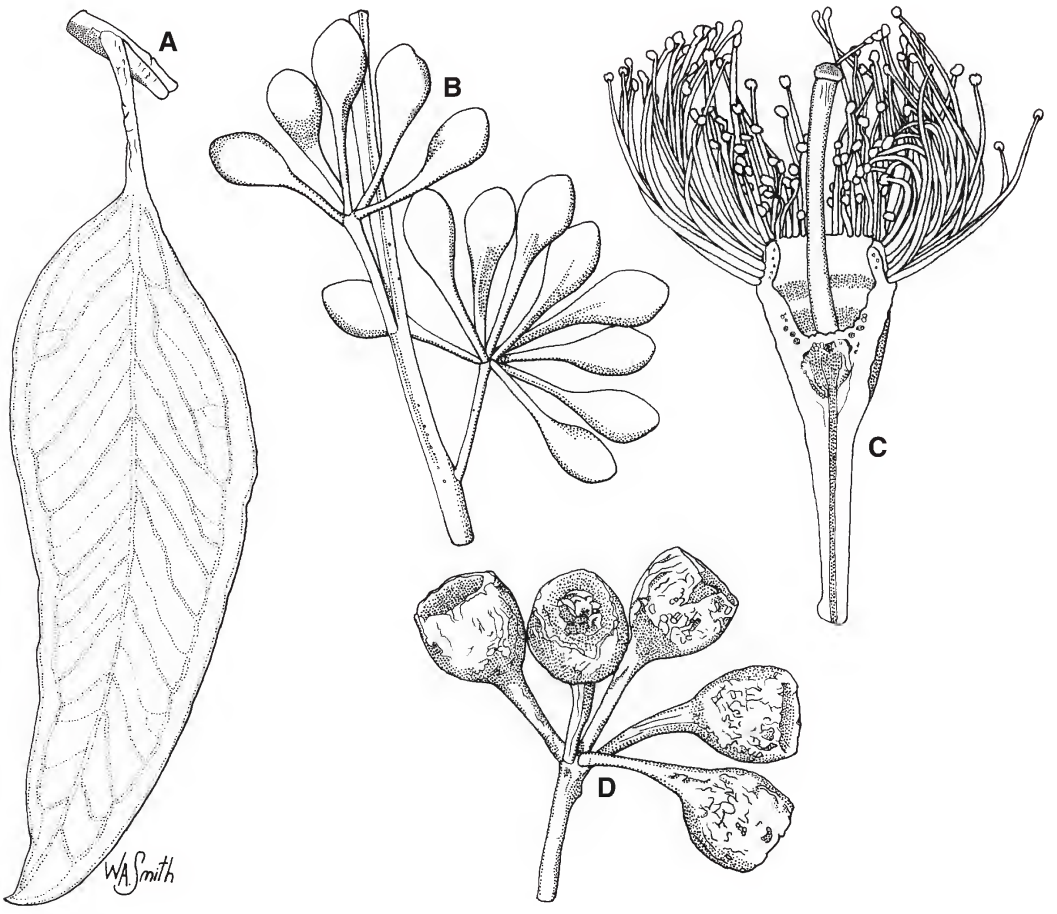

Fig. 1. ***Eucalyptus sideroxylon* subsp. *improcera*.** A. adult leaf × 1. B. inflorescences with mature flower buds × 1. C. longitudinal section of an open flower × 5. D. infructescence × 1.2. A,C,D from *Grimshaw G769 & Turpin* (BRI); B from *Brooker 9010* (BRI). Del. W.Smith.

***Distribution and habitat*:** *Eucalyptus sideroxylon* subsp. *improcera* is known only from the Waaje area of Barakula State Forest, about 70 km NNW of Chinchilla. Here it is confined to a sandy lateritised plateau supporting heathland and shrubland with scattered emergent eucalypts. The associated eucalypts are *Eucalyptus panda* S.T.Blake, *E. pachycalyx* subsp. *waajensis* L.A.S.Johnson & K.D.Hill, *Corymbia trachyphloia* (F.Muell.) K.D.Hill & L.A.S.Johnson subsp. *trachyphloia* and *C. bloxsomei* (Maiden) K.D.Hill & L.A.S.Johnson. The understorey is dominated by *Melaleuca uncinata* R.Br., but includes threatened shrub species such as *Calytrix gurulmundensis* Craven and *Homoranthus decumbens* (Byrnes) Craven & S.R.Jones.

***Phenology*:** Flowers are recorded from May to September. Fruits may be found all year round.

***Notes*:** *Eucalyptus sideroxylon* subsp. *improcera* differs from *E. sideroxylon* subsp. *sideroxylon* as follows: the adult leaves are rather short and broad, 3.5–5 times longer than broad (4.5–9 times longer than broad for *E. sideroxylon* subsp. *sideroxylon*); the inflorescences are usually 7-flowered but occasionally 9-flowered (5–7-flowered for *E. sideroxylon* subsp. *sideroxylon*); the mature buds are 11–14 mm long and 7.5–8 mm wide in the dried state (7–11 mm long, 4–6.5 mm wide for *E. sideroxylon* subsp. *sideroxylon*); the operculum is only half as long as the hypanthium (slightly shorter or equal to hypanthium in *E. sideroxylon* subsp. *sideroxylon*). The flowers of the new subspecies are consistently white; most or all Queensland populations of *E. sideroxylon* subsp. *sideroxylon* include a high proportion of red- or pink-flowered individuals.

The new subspecies is invariably a small stunted tree, whereas *Eucalyptus sideroxylon* subsp. *sideroxylon* is a taller tree of good form. In the taller eucalypt woodlands found adjacent to the Waaje site, no trees of *E. sideroxylon* exist, and the common ironbark *E. fibrosa* subsp. *nubilis* Maiden & Blakely occurs instead. The nearest stand of *E. sideroxylon* subsp. *sideroxylon* is near Tara, more than 100 km away to the south.

The fruit size of the new subspecies, while very large, is equalled by some forms of the typical subspecies. The fruit size of *Eucalyptus sideroxylon* subsp. *improcera* overlaps strongly with that of *E. tricarpa* (L.A.S.Johnson) L.A.S.Johnson & K.D.Hill; however, *E. tricarpa* can be distinguished by the 3-flowered inflorescences, longer pedicels and narrower adult leaves.

***Conservation status*:** The extant of occurrence and area of occupancy for *Eucalyptus sideroxylon* subsp. *improcera* is about 100 hectares. The number of mature plants is estimated to be fewer than 1000. There is no evidence of a decline in numbers for this taxon. Under the guidelines of the IUCN (IUCN 2001), this taxon is proposed for **Vulnerable** status based on the criterion D2.

***Etymology*:** The subspecific epithet is from the Latin *improcerus* meaning short or undersized. This is given in reference to the size and height of the trees, compared to typical *Eucalyptus sideroxylon.*

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Croton dichromifolius P.I.Forst. (Euphorbiaceae), a new species from Cape York Peninsula, Queensland

Paul I. Forster

Summary

Forster, P.I. (2010). *Croton dichromifolius* P.I.Forst. (Euphorbiaceae), a new species from Cape York Peninsula, Queensland. ***Austrobaileya* 8(2): 143-149**. A shrubby, perennial species of *Croton* L. from Bolt Head on eastern Cape York Peninsula is newly described. *Croton dichromifolius* P.I.Forst. is highly distinctive in the strongly discolorous foliage with multicoloured peltate scales. A second locality is reported for *Croton simulans* P.I.Forst., another species endemic to Cape York Peninsula. Putative relationships between *C. dichromifolius*, *C. simulans*, *C. capitis-york* Airy Shaw, and *C. stockeri* Airy Shaw are discussed, and an identification key to these Cape York Peninsula species is provided. Conservation status assessments of Vulnerable are recommended for both *C. dichromifolius* and *C. simulans*.

Key Words: Euphorbiaceae, *Croton*, *Croton capitis-york*, *Croton dichromifolius*, *Croton simulans*, *Croton stockeri*, Australia flora, Queensland flora, Cape York Peninsula, new species, taxonomy, identification key, conservation status

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Introduction

A revision of Australian *Croton* L. was published eight years ago with 27 native species recognised (Forster 2003). The existence of an undescribed taxon from Bolt Head on Cape York Peninsula was alluded to in the discussion of *C. capitis-york* Airy Shaw. The absence of fertile material at the time prevented description of this plant; however, recent field collections in November 2008 have remedied this deficit.

This undescribed species is named as *Croton dichromifolius* P.I.Forst. in the current paper. Under the schema of Forster (2003), this species can be placed in **Group 5**, along with *C. capitis-york*, *C. insularis* Baill., *C. mamillatus* P.I.Forst., *C. phebalioides* Muell.Arg., *C. simulans* P.I.Forst. and *C. stigmatosus* F.Muell. This group of species comprises all shrubs or small trees with penninerved foliage that is silver-white below due to a dense adpressed indumentum of trichomes and/or scales. Unpublished molecular data analyses of Australian *Croton* indicates that these species (with *C. stockeri* Airy Shaw added) may form a monophyletic lineage within *Croton* (P. Berry & B. van Ee, *pers. comm*. Feb 2010), and an identification key is provided for the north eastern Cape York Peninsula species of this group.

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Materials and methods

Data presented and discussed in this paper are based on field collections made in 2008 and deposited in the Queensland Herbarium (BRI) with distribution of duplicates as indicated. The morphological description (especially indumentum types) is modelled on those of Forster (2003). Venation terminology largely follows Hickey (1973) and Ash *et al.* (1999) with the recognition of a midrib (1° vein order), lateral veins (2° vein order) and intercostal veins (3° and onwards vein orders) within any leaf lamina. When an intercostal vein comprises a continuous raised line of cells it is termed 'distinct'; if it is discontinuous or fades away into the body of the lamina, it is termed 'indistinct'. Indumentum cover is described using the terminology of Hewson (1988), except that 'scattered' is used instead of 'isolated'. The shapes of leaves, sepals and petals are described using the terminology of Hickey & King (2000). Length and width dimensions are indicated as length × width followed by the measurement unit.

Taxonomy

Croton dichromifolius P.I.Forst., **species nova** *C. capitis-york* affinis, a qua petiolo foliorum squamis densis implicitis peltatis (in illo trichomatibus densis stellatis) induta, folii lamina basi rotundata usque ad infirmissime cordata (cuneata vel truncata in *C. capitis-york*), nectariis extrafloralibus quae tantum infra visibilia sunt (in illo utrinque visibilia), fructibus minoribus depresso-globosis (non subglobosis) indumentis squamarum sparsarum peltatarum et trichomatum sessilium stellatorum (in illo indumentis trichomatum densorum stellatorum in protuberationibus mamillatis) differt. **Typus:** Queensland. Cook District: Bolt Head, Olive River Environmental Reserve, Cape York Peninsula, 16 November 2008, *P.I.Forster PIF34570 & K.R.McDonald* (holo: BRI [3 sheets + spirit]; iso: CNS, L, MEL, MICH, NSW, MO, Z).

Perennial shrub to 5 m tall, evergreen, monoecious; indumentum primarily of sessile peltate trichomes and peltate scales, pale silver-yellow to uncoloured (appearing silver *en masse*), peltate scales generally silver-yellow in central column and uncoloured in the rays, other trichomes uncoloured; 'ginger' scent to cut roots and foliage. Bark nondescript, smooth, cream white. Branchlets ± rounded, with dense peltate scales when young and on most leafy stems, glabrescent; stipules subulate, entire, 1.5–2 × 0.7–0.8 mm, with dense peltate scales. Leaves alternate, coriaceous, markedly discolorous, petiolate; petioles 8–32 × 0.7–1 mm, channelled on top, with dense peltate scales; lamina elliptic-ovate to obovate, chartaceous, 35–113 × 16–63 mm, penninerved with 8–10 lateral 2° veins per side of 1° midrib; upper surface matt to somewhat glossy, mid to dark green, 1° and 2° veins impressed, 3° veins obscure, sparse peltate scales over entire surface, but more concentrated on 1° and 2° veins; lower surface silver-white, 1° and 2° veins prominently raised, 3° veins scarcely raised and indistinct, surface completely obscured by dense, interlocking peltate scales, neither scabrid nor velutinous; margins slightly undulate, not toothed; foliar glands absent; tip acute to acuminate, base rounded to very weakly cordate; extrafloral nectaries 2 at base of leaf lamina, sessile or slightly raised, oblong and often bilobed, 0.8–1 × 0.4–0.5 mm, visible only below. Inflorescence up to 40 mm long, unbranched, usually bisexual and androgynous, often with mixed glomerules, pedunculate to 5 mm, axis with dense, interlocking peltate scales; bracts linear, *c.* 1.5 × 0.2 mm, with sparse peltate trichomes (no scales). Male flowers 1.5–2 mm long, 1.5–2.3 mm diameter, relatively evenly distributed along inflorescence axis in glomerules of 2–4, rarely singly, spaced 2–3.5 mm apart; pedicels 0.8–2.2 × 0.2–0.3 mm, with sparse to dense peltate scales or an admixture of peltate trichomes and scales; sepals valvate, lanceolate-ovate, 1–1.4 × 0.6–1 mm, with dense peltate trichomes or an admixture of peltate trichomes and scales; petals absent; stamens 11 or 12, with dense stellate and simple trichomes at base, filaments filiform, 1.8–2 × *c.* 0.1 mm, glabrous, anthers oblong, 0.4–0.5 × 0.2–0.3 mm, glabrous. Female flowers 2.5–4 × 2.5–4 mm, usually held singly and spaced up to 9 mm apart on inflorescence axis; pedicels 0.8–4 × 0.5–1 mm, with dense, interlocking peltate scales or an admixture of peltate trichomes and scales; sepals valvate, lanceolate-ovate, 1.2–2.5 × 0.8–1.5 mm, with an admixture of peltate trichomes and scales; petals absent; styles 3, linear-flabellate to 1.6 mm long, multifid, once divided for 0.5–0.6 mm, barely connate at base, with scattered stellate trichomes or glabrous; ovary 3-locular, 2–3 mm long, 3–5 mm diameter, with dense, interlocking peltate and stellate trichomes. Fruits trilobate, depressed-globose, 4–6 mm long, 7.5–8 mm diameter, with sparse peltate and stellate trichomes; seeds not seen. **Fig. 1.**

***Additional specimens examined*: Queensland.** Cook District: Bolt Head, Temple Bay, Jun 1996, *Forster PIF19406* (A, CNS, K, MEL); Bolt Head, Olive River Environmental Reserve, Cape York Peninsula, Nov 2008, *Forster PIF34582 & McDonald* (BRI, CNS, MEL).

***Distribution and habitat*:** *Croton dichromifolius* has thus far been found only in the vicinity of Bolt Head, Temple Bay (**Map 2**). Plants grow in the understorey of coastal vineforest (araucarian microphyll vineforest/ semi-deciduous microphyll vineforest) on consolidated, aeolian sand ridges near the sea. It co-occurs with *C. capitis-york* at this locality and no intermediates were observed.

Fig. 1. Croton dichromifolius. A. branchlet with inflorescence × 0.6. B. abaxial leaf surface × 1. C. abaxial leaf lamina base showing extrafloral nectaries × 6. D. inflorescence with male and female flowers × 2. E. lateral view of male flower × 16. F. lateral view of female flower × 8. G. face view of fruit × 4. H. lateral view of fruit × 4. All from *Forster PIF34582* (BRI). Del. W.Smith.

***Notes*:** *Croton dichromifolius* has markedly discolorous foliage, although this in itself is a common character in the genus. The dense, interlocking peltate scales impart a silver-white appearance to the lower surface of the leaf lamina, although on close examination with magnification the scales appear yellow-silver in the central column with only the uncoloured rays appearing silver.

Croton dichromifolius may be diagnosed against *C. capitis-york*, although it remains to be determined with molecular analysis whether the two species are closely related. Compared to *Croton capitis-york, C.dichromifolius* has leaves with dense interlocking peltate scales on the petiole (versus dense stellate trichomes), a leaf lamina base that is rounded to very weakly cordate (versus cuneate or truncate), extrafloral nectaries that are visible only below (versus visible above and below); smaller fruit that are depressed-globose (versus subglobose) and with an indumentum of sparse peltate scales and sessile stellate trichomes (versus dense stellate trichomes on mamillate protuberances).

The apparent absence of petals in the male flowers of the available material of *Croton dichromifolius* is unusual as they are present in all other native Australian taxa (Forster 2003). Some predominantly herbaceous taxa of North American and Caribbean *Croton* (*Croton* sections *Eremocarpus* (Benth.) G.L.Webster and *Drepadenium* (Raf.) Müll. Arg.) also lack these petals (Webster 1993), or they are greatly reduced and appear absent on floral dissection. More material of *C. dichromifolius* is required to ascertain whether this is a consistent feature of the species.

***Conservation status*:** *Croton dichromifolius* is abundant at Bolt Head, where it occurs in a vegetation community that is home to several local, or near local endemics, e.g. *Cycas silvestris* K.D.Hill, *Syzygium argyropedicum* B.Hyland, *Xanthostemon youngii* C.T.White & W.D.Francis and *Xylosma* sp. (Temple Bay P.I.Forster PIF8980).

There are no obvious threats to the habitat of *Croton dichromifolius*; however, the area of occurrence is less than 50 km² and the area of occupancy much smaller. Under the *IUCN* (2001) criteria, this species can be assessed as **Vulnerable** on the criterion D2.

***Etymology*:** The specific epithet is derived from the Greek *dis* (double), *chroma* (colour) and *folius* (leaf) and alludes to both the strikingly discolorous foliage and the two coloured peltate scales prevalent on the foliage.

Croton simulans P.I.Forst., *Austrobaileya* 6: 412 (2003).

***Additional specimen examined*: Queensland.** Cook District: 6.5 km W of Shelburne Bay, 5.5 km W of Messum Hill, Cape York Peninsula, Jun 2008, *Forster PIF33941 & McDonald* (BRI, CNS, MEL).

***Distribution and habitat*:** *Croton simulans* is now known from two localities on Cape York Peninsula that are disjunct by approximately 230 kmn (**Map 2**). Both populations are in hoop pine dominated vineforest on granite substrates, a vegetation community that is patchily and rather rarely distributed north of the McIlwraith Range.

***Notes*:** This additional collection of *Croton simulans* differs slightly from those at the type locality in the degree and composition of indumentum cover, notably denser stellate trichomes and fewer peltate scales on the leaf lamina. The extrafloral nectaries are also visible above and below due to their position well below the base of the leaf lamina.

***Conservation status*:** *Croton simulans* is present in Kulla (McIlwraith Range) National Park and the Olive River Environmental Reserve. There are no obvious threats to the habitat of *Croton simulans*; however, the area of occurrence is less than 1500 km² and the area of occupancy much smaller. Under the IUCN (2001) criteria, this species can be assessed as **Vulnerable** on the criterion D2. The species should be searched for in other patches of similar habitat, particularly in the area between the McIlwraith and Iron Ranges.

Croton dichromifolius and *C. simulans* may be distinguished from the putatively related *C. capitis-york* and *C. stockeri* with the following identification key.

1 Branchlets with peltate scales only 2
1. Branchlets with admixture of peltate scales and stellate trichomes, or only stellate trichomes 3

2 Leaf petioles with dense stellate trichomes . . . . . **C. capitis-york**
2. Leaf petioles with dense, interlocking peltate scales . . . . . **C. dichromifolius**

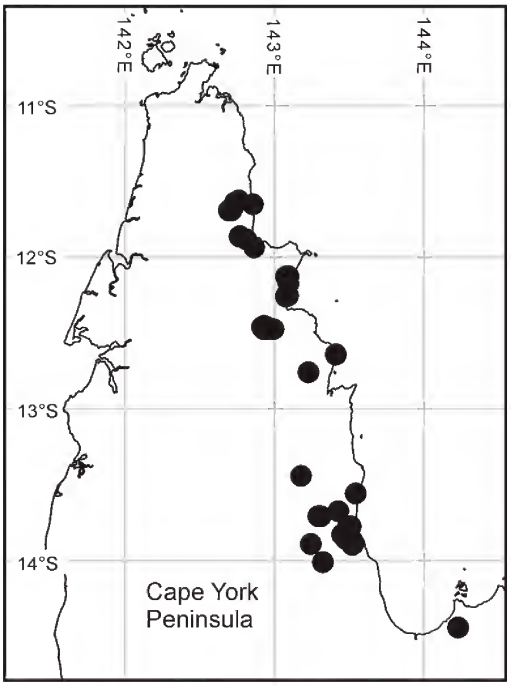
3 Indumentum orange-brown; branchlets with stellate trichomes only . . . . . **C. stockeri**
3. Indumentum silver; branchlets with admixture of peltate scales and stellate trichomes . . . . . **C. simulans**

In the previous identification key to Australian *Croton* (Forster 2003), *C. dichromifolius* will key to *C. capitis-york*.

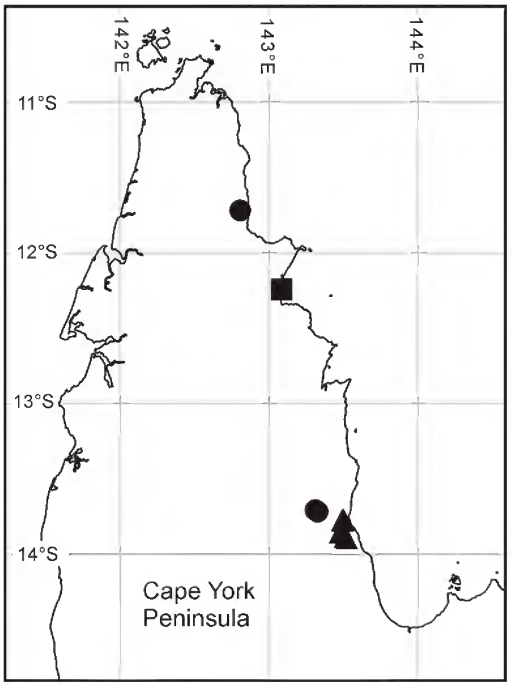
General Discussion

Formal grouping of species within the giant genus *Croton* (over 1200 species world wide) based upon gross morphology is probably doomed to failure, per my earlier comments (Forster [2003] on Webster [1993]). An ongoing molecular project to provide an overall phylogenetic framework for *Croton* (Berry *et al.* 2005) will hopefully provide resolution that can be tied to morphological groups. In this respect the relationship between *C. capitis-york*, *C. dichromifolius*, *C. simulans* and *C. stockeri* is of interest as the grouping comprises one relatively widespread species (*C. capitis-york* in semideciduous vinethickets/vineforests on sandy or lateritic soils derived from Cainozoic duricrusts and sand plains) and three that are highly restricted, of which two (*C. dichromifolius* and *C. stockeri*) are found only in coastal vinethickets/vineforests on stabilised sand dunes and one (*C. simulans*) in hoop pine dominated microphyll vineforests at more inland localities, generally on areas of outcropping granite rock (**Maps 1 & 2**). Taxonomic classification of these four taxa is via differences in indumentum composition and cover, leaf morphology and some floral and fruit characters.

The geomorphology of northeastern Cape York Peninsula is complex, particularly in areas where there are active dune fields. At Bolt Head, Temple Bay (where *Croton dichromifolius* is found), the vineforest occurs on stabilised sand dunes that are probably of Pleistocene origin that overlay Mesozoic sandstone (Pye 1983), and no active dune fields are present. At Silver Plains (where *C. stockeri* occurs), the topographic relief is more subdued with no active dune fields, and the stabilised sand dunes are Pleistocene in origin (Luly *et al.* 2006). There is clear evidence in the form of springs and soakage areas that the Silver Plains vineforest occurs on sand that is shallowly overtopping a large lens of fresh water and considerable drainage in the area ends up in Three-Quarter Mile Lake (Luly *et al.* 2006). One of the known localities for *C. simulans* (the one reported above) at Shelburne Bay has the vineforest patch being enveloped by an active dune field, a phenomenon that is thought to be relatively recent (Holocene) and probably initiated in the Little Ice Age some 300–500 years ago (Pye 1983; Lees *et al.* 1990; Lees 2006). The original locality for *C. simulans* in the McIlwraith Range can be considered to be in a refugial area with the 'dry' hoop pine vineforest on the margins of the 'wet' rainforest along the upland granite watercourses. *Croton capitis-york* by contrast is widespread in a number of disjunct populations in dryer semi-deciduous microphyll vineforests and is far more catholic in its ecophysiological ability to occur on diverse substrates. An evolutionary hypothesis for these four taxa is that *C. capitis-york* is a 'core' species in the older, more widespread and perhaps stable (at least in an ecophysiological sense) habitats, *C. simulans* is a 'refuge-endemic' in older, albeit restricted and disjunct refugia and that *C. dichromifolius* and *C. stockeri* are 'neo-endemics' in newly available areas of habitat.



Map 1. Distribution of *Croton capitis-york* on eastern Cape York Peninsula



Map 2. Distribution of *Croton dichromifolius* (■), *C. simulans* (●) and *C. stockeri* (▲) on eastern Cape York Peninsula

Acknowlegements

Field work on Cape York Peninsula was funded in June 2008 by the Cape York Tenure Unit of Queensland Parks & Wildlife Service and in November 2008 by the federal government funded Natural Heritage Trust. Keith McDonald and various staff from Queensland Parks and Wildlife Service provided support in the field. Will Smith drew the illustrations and Peter Bostock translated the Latin diagnosis and provided the distribution maps.

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Austrobaileya 8(2): 149–150 (2010)

Book Review

The Flowering of Australia's Rainforests – a plant and pollination miscellany. G.Williams & P.Adam (2010). CSIRO Publishing: Melbourne. Hardback, 200 pp, 34 colour photographs. ISBN 9780643097612. $99.95 AUD.

For most flowering plants and gymnosperms, successful pollination is essential for reproduction. Pollination and the vectors that perform it are usually the last aspect considered in any assessment of autecology for a given plant species or community, despite their role being essential in the evolution of species. The body of published work on pollination in Australian rainforests has been previously piecemeal and often hidden in obscure journal papers; hence, this is a welcome synthesis on the subject, albeit with a major backbone of research and theory from the global literature.

This book comprises nine chapters. In Chapter 1, **Flowers and pollination in lore and legend** is examined. This comprises a short review of historical aspects (many biblical or from English poetry), closing with Australian aboriginal examples at the end.

Chapter 2 covers **Categorising rainforest plants**. The authors take a very broad approach by starting with the gymnosperm groups of the cycads and conifers. It was somewhat disconcerting to immediately read basic errors in plant biology and statistics such as "cycads are usually dioecious" (repeated in caption to p. 31) (all cycads are dioecious) and that the Australian cycad flora is "approximately 30 species" (there are about 80 species). Most cycads don't occur in rainforest in Australia, yet, the most interesting ones that do such as *Lepidozamia hopei* (the world's tallest cycad) are not mentioned at all. *Cycas circinalis* is stated to occur in "India, Asia and the South Pacific" (India is part of Asia and this species does not occur in the South Pacific); either way, it doesn't occur in Australia and doesn't grow in rainforest. Comments on conifers are little better with "native conifers are frequently dioecious", "in north-east Australia the Podocarpaceae and Araucariaceae are confined to rainforest" (there are podocarps in eucalypt communities) and "both *Araucaria* and *Agathis* are absent from more complex north-eastern Australian rainforests owing to their inability to regenerate below the dense, shade inducing, floristically complex angiosperm canopies" (which is just plain incorrect). They state that *Euroschinus falcatus* (an angiosperm) is dioecious; however, Jessup (1985) was of the opinion that they were polygamous with male, female or hermaphrodite flowers. While the authors quite openly state that the book is slanted at rainforest systems in New South Wales (nearly all the photos are of species from New South Wales).

Chapter 3 examines **Rise of the Angiosperms, and archaic vascular plants in Australian rainforests**. This concisely provides a potted history of the modern (molecular) view of plant families and flower evolution, although in some cases they stick with tradition (e.g. Euphorbiaceae in the broad sense). There are patches of emotive text such as "grim blanketing of the Antarctic landmass" (p. 35) and some of the conclusions on relic taxa may be no more than illusory. This chapter would have benefited from a geological time scale for the lay reader.

In Chapter 4: **Being a flower,** they examine flower structure, colour and fragrance and what it means to pollination. There is lyrical waxing on p. 59 about the dedication of pollination ecologists!

Chapter 5 covers **Introduction to breeding systems.** There is a good conservation biology slant throughout this chapter with comments such as "local populations of many species are now very small, in some cases reduced to single individuals per stand" and "species become functionally extinct within individual remnants". Essentially loss of genetic diversity (in part from failure of pollination) leads to extinction. This probably gets the message across to conservation managers, but perhaps should have been emphasised later in the book.

Chapter 6 provides an overview of **Spatial and temporal structure of rainforest** and how it influences pollination and subsequent reproduction. Phenology, the length of flowering life, forest strata and synusia (stratified layers) are examined in some detail.

Australian Vegetation History is reviewed in Chapter 7. As with elsewhere on the earth, obligate pollination mutualisms are concluded to be most at risk and sensitive to disturbance. There is discussion about sparse and mass flowering and pollination guilds, but the text of this chapter doesn't really reflect the title.

In Chapter 8, **Pollination of the Australian flora**, it is all about Myrtaceae, and only two pages of text!

Chapter 9 on **Pollination syndromes: who brings the 'flower children' in rainforest?** is more detailed and looks at specific groups of pollinators (e.g. birds, bats, flies, bees etc.) as well as wind. This provides a good opportunity for some detailed discussion on certain plants and their pollinators and is perhaps one of the most comprehensive chapters.

Finally there are short to long appendices on pollination and conservation of remnant communities (i.e. in New South Wales) and case studies (pretty well all from New South Wales), large insects (most pollinating insects are small), dioeciousness or not (this time plainly stating it to be in the subtropics, i.e. New South Wales), self compatibility (ditto comment), coppice regenerators (only 10 species listed, all from New South Wales), pollen groups, and thrips associated with flowers.

Throughout the text, no references are cited or numbered; although, there is a long list at the end. So the reader either delves through all of these to try and find something more specific than was in the text (I'm not sure how you cross reference though), or nowadays can perhaps just use Google Scholar for the information. Maybe it is a sign of things to come, but this 'modern' approach to scientific referencing by CSIRO publishing is annoying to say the least.

This book is a useful compendium of information and at times gets on a liquid roll in terms of the stories that it tells; however, it could have been greatly improved with sharper editing and structure throughout. It is nicely produced in hardcover (unlike other recent CSIRO products; see other reviews this journal number), but relatively expensive at $100 plus (once you have it posted to you).

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Paul I. Forster, Queensland Herbarium.

Crudia abbreviata A.R.Bean (Caesalpiniaceae), a new species from Cape York Peninsula, Queensland

A.R.Bean

Summary

Bean, A.R. (2010). *Crudia abbreviata* A.R.Bean (Caesalpiniaceae), a new species from Cape York Peninsula, Queensland. ***Austrobaileya* 8(2): 151–154.** The new species *Crudia abbreviata* A.R.Bean is described and illustrated. It is endemic to Cape York Peninsula, Queensland and considered to be closely related to *C. blancoi* Rolfe. A key to the Australian species of *Crudia* is provided.

Key Words: Caesalpiniaceae, *Crudia*, *Crudia abbreviata*, *Crudia blancoi*, Australia flora, Queensland flora, taxonomy, new species, identification key

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Introduction

Crudia Schreb. is a genus of 50–55 species distributed in south-east Asia, Cape York Peninsula in northern Australia, central Africa, tropical South America, Central America and the Caribbean (Mackinder 2005). It reaches its greatest diversity in Malesia where there are 30 species (Hou 1996). Only one species (*C. papuana* Kosterm.) has previously been recorded for Australia (Ross 1998), where it is apparently confined to the Jardine River in the far northern part of Cape York Peninsula in Queensland.

The species described here was first collected in 1974 by Geoff Tracey, but without flowers or fruits, and it was tentatively identified as a *Pterocarpus* species. Only relatively recently has flowering and fruiting material of the species become available, showing it to be a new species of the genus *Crudia*.

Materials and methods

This paper is based on herbarium material present at BRI. Measurements of floral parts are based on material reconstituted in boiling water, while all other measurements are based on dried herbarium material. Length and width dimensions are indicated as length × width followed by the measurement unit. National Park is abbreviated N.P.

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Taxonomy

Crudia abbreviata A.R.Bean **species nova** *C. blancoi* affinis, sed inflorescentiis 3–5.5 cm longis (13–17(–27) cm longis in *C. blancoi*), pedicellis e basi articulatis (in illa ad apicem articulatis) et stipite ovarii *c.* 1.2 mm longo (*c.* 0.5 mm longo in *C. blancoi*) differens. **Typus:** Queensland. Cook District: Cultivated at Yuruga Nursery, Walkamin, ex Stone Crossing, [*c.* 45 km NE of Weipa,] 23 September 1998, *G. Sankowsky 1631* (holo: BRI; iso: CNS).

Crudia sp. (Archer River BH 3078RFK); Hyland *et al.* (2003).

Pterocarpus sp. (Archer River B.P.Hyland 3078); Holland & Pedley (2007: 80).

Trees to 27 m high. Bark flaky. Stipules subulate, linear to narrowly-deltate, 2–3 mm long, deciduous. Leaves (3–)4–7-foliolate, petiole and rachis together 4–7.5 cm long, sparsely hairy; rachis tip extending up to 5 mm beyond terminal leaflet, but rarely seen (caducous). Leaflets alternate, thin, chartaceous or membranous, ovate, 28–98 × 12–41 mm, all about the same size or the basal ones smaller; apex acute to acuminate; base obtuse to broadly cuneate, more or less symmetric; green and glabrous above, creamy or rusty below with moderately dense cover of simple appressed to patent hairs; petiolules 2–4 mm long. Inflorescence racemose, axes 3–5.5 cm long, densely puberulous, bearing

70–100 flowers. Bracts narrowly-deltate, 0.9–1.3 mm long, with dense, rusty antrorse hairs; bracteoles 2, opposite to sub-opposite, ovate to deltate, 0.4–1 mm long, with dense, rusty antrorse hairs, attached to the proximal one-third of the pedicel, persistent at least to anthesis. Pedicels 5.5–7 mm long at anthesis, articulated at the base, glabrous or with sparse antrorse to patent hairs. Hypanthium hemispherical to bowl-shaped, 1.5–2 mm long, glabrous. Calyx lobes 4, elliptical, cymbiform, glabrous, 2.5–3.5 × 1.8–2.8 mm, pale green, recurved after anthesis, apex obtuse. Petals absent. Stamens (8–)10; filaments 5.5–6.5 mm long, white, glabrous; anthers versatile, 0.8–0.9 mm long, yellow. Ovary stipe *c.* 1.2 mm long, glabrous except distally; ovary 1.5–2 mm long, densely hairy, ovules 2; style 1.2–2 mm long, curved, glabrous; stigma small, obscure. Immature pods shortly stipitate, obliquely oblong, 3.7–4 × 3–3.3 cm, somewhat woody, transversely wrinkled, flat, not beaked, densely rusty-hairy. Seeds not seen. **Fig. 1.**

***Additional specimens examined*: Queensland.** Cook District: Stone Crossing, Wenlock River, Oct 1980, *Hyland 10781* (BRI, CNS); Wenlock River, Moreton Telegraph Office, Jul 1988, *Dalliston CC221* (BRI); Archer Bend N.P., 120 km WNW of Coen, Jun 1994, *Fell DGF4360 & Buck* (BRI; NSW, to be distributed); Archer River, Sep 1974, *Hyland 3078* (BRI, CNS); Archer Bend N.P., Horsetrader Lagoon, *c.* 46 km SW of Merluna Homestead, Dec 1990, *Fell 2269 & Jensen* (BRI); Archer Bend, Archer River, Sep 1974, *Tracey s.n.* (BRI); 13 km N of junction of Archer and Coen Rivers, Archer Bend N.P., Jun 1993, *Neldner 4071* (BRI, CNS, DNA); Piccaninny Creek on Piccaninny Plains (Station) Wildlife Sanctuary, Oct 2008, *Jensen 1680 & Nicholson* (BRI; CANB, CNS, DNA, MEL, to be distributed).

***Distribution and habitat*:** Endemic to Queensland. Known only from the Wenlock River and Archer River and some tributaries, in the central-northern part of Cape York Peninsula between latitudes 12°20′S and 13°30′S (**Map 1**). It inhabits well-developed semi-deciduous notophyll rainforest along riverbanks and flood-channels. Other tree species found in association include *Buchanania arborescens*, *Mallotus philippensis*, *Lagerstroemia archeriana*, *Syzygium bamagense*, *Elaeocarpus arnhemicus*, *Terminalia sericocarpa*, *Ficus drupacea*, *Diospyros calycantha*, *Canarium australianum* and *Bombax ceiba*. Altitude ranges from 10–90 metres.

***Phenology*:** Poorly known. In habitat flower buds have been collected in June, and immature fruits in October. Trees flowered in September in cultivation at Tolga, which is considerably south of the known distribution.

***Affinities*:** *Crudia abbreviata* is perhaps most closely related to the Malesian species *C. blancoi* Rolfe, based on descriptions given by Hou (1996). *Crudia abbreviata* differs from *C. blancoi* by the inflorescences 3–5.5 cm long (13–17(–27) cm long for *C. blancoi*), pedicels articulated at the base (articulated at the apex in *C. blancoi*) and the ovary stipe *c.* 1.2 mm long (*c.* 0.5 mm long for *C. blancoi*).

***Notes*:** Verdcourt (1979) presented a description for a "Crudia sp. near blancoi Rolfe", which he indicated occurred in the Western Province of Papua in "riverine savannah" at 30 m altitude. He did not cite any specimens, but from the description given, this taxon could be conspecific with *C. abbreviata*.

Key to the Australian species of *Crudia*

Leaflets 2, coriaceous, glabrous on lower surface; pedicels 0.5–3 mm long; inflorescence axes glabrous or sparsely hairy . . . . . **C. papuana**

Leaflets 3–7, chartaceous or membranous, a moderately dense tomentum present on lower surface; pedicels 5.5–7 mm long; inflorescence axes densely puberulous . . . . . **C. abbreviata**

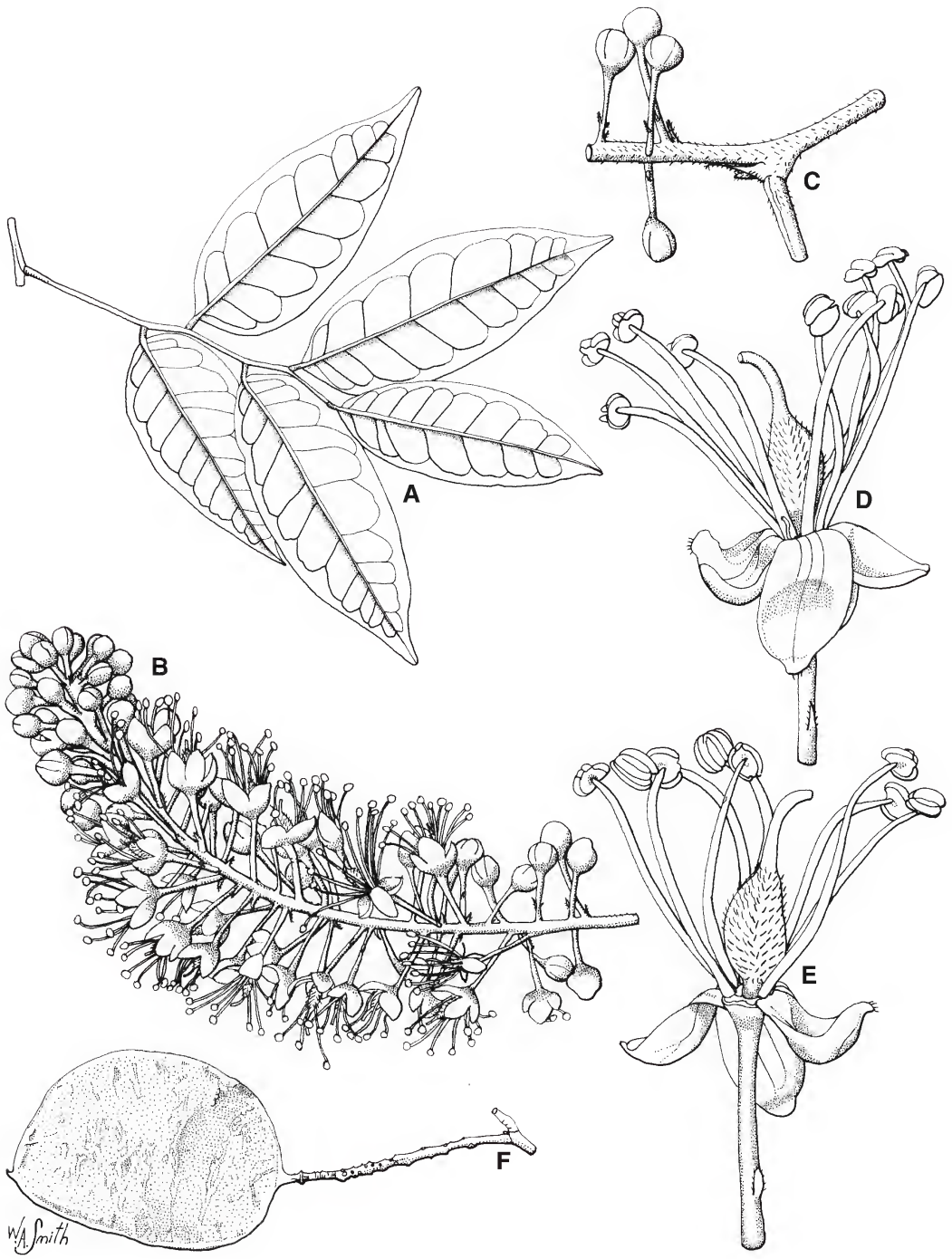

Fig. 1. ***Crudia abbreviata.*** A. leaf × 1. B. Inflorescence × 2. C. portion of rachis and flowers buds, showing bracteoles and bracts × 3. D. intact flower and pedicel × 6. E. flower with one sepal removed × 6. F. immature fruit and rachis × 1. A,F from *Jensen 1680 & Nicholson* (BRI); B–E from *Sankowsky 1631* (BRI). Del. W.Smith.

D.Fell (*in litt.*) stated that this species also occurs along Cox Creek, a tributary of the Wenlock River, in association with *Syzygium bamagense*, *Calophyllum sil*, *Buchanania arborescens*, *Melaleuca leucadendra*, *Beilschmiedia obtusifolia*, *Vitex glabrata*, *Syzygium forte* subsp. *forte* and *Mallotus polyadenos*. I am unaware of any herbarium specimens of this species from Cox Creek.

Conservation status: *Crudia abbreviata* is known from at least five populations, and some of these have subpopulations that may behave as components of genetic metapopulations. At the known sites, the species is locally common, but the number of mature individuals is unknown. The area of occurrence of known populations is *c.* 7000 km². There are considerable areas of riverine gallery forest that have never been botanically explored in the area of occurrence and the species is likely to be much more widespread than currently known. However, the area of occupancy is unlikely to exceed 40 km². The species has been recorded from the Conservation Reserve Estate in Mungkan Kandju National Park (formerly Archer Bend N.P.) and on the Australian Wildlife Conservancy property 'Piccaninny Plains'. The suggested conservation status is **Near Threatened** based on the criterion D of IUCN (2001).

Etymology: From the Latin *abbreviatus*, meaning shortened. This is a reference to the length of the inflorescences, which are shorter in this species than in almost all other species of the genus.

Acknowledgements

I am grateful to Paul Forster for information on the conservation status of *Crudia abbreviata*. Will Smith supplied the illustrations and the map, while Peter Bostock provided the Latin diagnosis. David Fell sent extra information on this species from his field notes.

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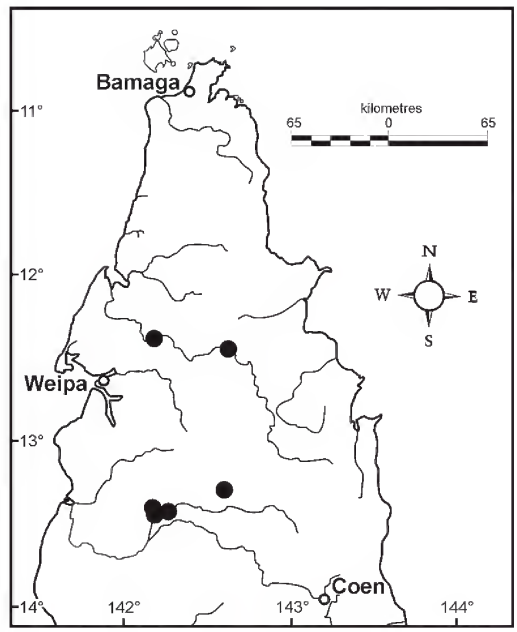

Map 1. Distribution of *Crudia abbreviata*.

The genus *Amaracarpus* Blume (Rubiaceae) in mainland Australia

Paul I. Forster

Summary

Forster, P.I. (2010). The genus *Amaracarpus* Blume (Rubiaceae) in mainland Australia. ***Austrobaileya* 8(2): 155–158.** The genus *Amaracarpus* Blume is represented in mainland Australia by a single, non-endemic species in the Wet Tropics bioregion of north-east Queensland. The new combination *Amaracarpus nematopodus* (F.Muell.) P.I.Forst. is made based on *Psychotria nematopoda* F.Muell. and represents an earlier name for the species previously known as *A. heteropus* Valeton. Illustrations based on Australian material are provided, together with notes on variation, distribution, habitat and conservation status.

Key Words: Rubiaceae, *Amaracarpus*, *Amaracarpus heteropus*, *Amaracarpus nematopodus*, *Psychotria nematopoda*, Australia flora, New Guinea flora, Queensland flora, taxonomy, nomenclature, new combination

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Introduction

Amaracarpus Blume was revised by Davis & Bridson (2004) who recognised 22 species distributed widely in south-east Asia, Malesia (Java, Moluccas, New Guinea, Philippines), Christmas Island, Seychelles and Melanesia (Solomon Islands). The majority of species (20) are native to the island of New Guinea where they occur in a wide range of rainforest habitats on diverse substrates. *Amaracarpus* is closely allied to genera such as *Calycosia* A.Gray, *Dolianthus* C.H.Wright, *Hydnophytum* Jack, *Psychotria* L. and *Straussia* A.Gray (Andersson 2002; Davis & Bridson 2004); but may be defined by a combination of vegetative and floral characters outlined in detail by the latter authors.

Davis & Bridson (2004: 53) recorded *Amaracarpus heteropus* Valeton as occurring widely in New Guinea, but also in north Queensland based on a single collection (*Schodde 3306*). Recognition of *Amaracarpus* as a genus that occurs in mainland Australia has otherwise been ignored until the current paper where the application of the name *A. heteropus* is resolved in relation to the cited collection and others that are conspecific with it. A second species (*A. pubescens* Blume subsp. *pubescens*) occurs in Australia on Christmas Island (Du Puy 1993; Davis & Bridson 2004) but is not considered further here.

The collection *Schodde 3306* (BRI duplicate) had been previously determined by Sally Reynolds on the 17th May 1991 as *Psychotria nematopoda* F.Muell. based upon her examination of the type of that species name held at the National Herbarium of Victoria (MEL). Consequently collections of this species held at the Queensland Herbarium have been identified under that name, prior to a revision of the Australian species of *Psychotria sens. lat.* being completed. The type of *P. nematopoda* belongs to the genus *Amaracarpus* and is conspecific with the taxon delimited as *A. heteropus* by Davis & Bridson (2004). As *Psychotria nematopoda* is an earlier name, hence prior specific epithet, a new combination is provided in *Amaracarpus*. An adequate morphological description for this species can be sourced in Davis & Bridson (2004).

Materials and methods

The materials discussed and illustrated in this paper are held at the herbaria BRI, CANB, CNS and MEL and includes material collected

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in habitat by the author. Abbreviations in the specimen citations are: N.P. (National Park); L.A.(Logging Area); S.F./S.F.R. (State Forest/ State Forest Reserve); T.R. (Timber Reserve).

Taxonomy

Amaracarpus nematopodus (F.Muell.) P.I.Forst. **comb. nov.**; *Psychotria nematopoda* F.Muell., *Fragm.* 7: 49 (Oct 1869); *Uragoga nematopoda* (F.Muell.) Kuntze, *Revis. Gen. Pl.* 2: 961 (1891). **Type:** Queensland. North Kennedy District: Mackay River [now Tully River], 15 October 1867, *J.Dallachy s.n.* (holo: MEL1583760).

Amaracarpus heteropus Valeton, *Nova Guinea* 8(4): 769 (1912), ***syn. nov.*** **Type:** Indonesia. West Papua: Tami-river, 8 July 1910, *K.Gjellerup 264* (lectotype: L; isolecto: BO, L; *fide* Davis & Bridson 2004: 50).

Amaracarpus longifolius Valeton, *Nova Guinea* 8(4): 770 (1912), ***syn. nov.***, *nom. illeg. non* Elmer. **Type:** Indonesia. West Papua: Augusta River, 5 October 1910, *K.Gjellerup 327* (lecto: BO; isolecto: BO, L; *fide* Davis & Bridson 2004: 50).

Amaracarpus lanceolatus Valeton, *Bot. Jahrb. Syst.* 61: 115 (1927), ***syn. nov.*** **Type:** Indonesia. West Papua: "reg. flum. Mamberamo, Prauwenbivak", 6 September 1920, *H.J.Lam 1084* (lecto: L; isolecto: L, U [photo!]; *fide* Davis & Bridson 2004: 50).

Amaracarpus corymbosus Valeton, *Bot. Jahrb. Syst.* 61: 115 (1927), ***syn. nov.*** **Type:** Indonesia. West Papua: "Nova Guinea neerlandica meridonalis", 20 June 1914, *W.K.H.Feuilletau de Bruyn 47* (lecto: BO; isolecto: K, L; *fide* Davis & Bridson 2004: 50).

Amaracarpus urophyllus Merr. & L.M.Perry, *J. Arnold Arbor.* 17: 221 (1946), ***syn. nov.*** **Type:** Papua New Guinea. Central Province: Mt Tafa, September 1933, *L.J.Brass 4998* (holo: A *n.v.*; iso: BRI; NY [photo!]).

Illustrations: Cooper & Cooper (2004: 450, as *Psychotria nematopoda*); Davis & Bridson (2004: 51, 52).

Additional selected specimens examined **(*cited by Davis & Bridson [2004]): Indonesia.** West Papua. Rouffaer River, Aug 1926, **Docters van Leeuwen 9718* (BRI); Cycloop Mountains, southern slope of Makanoi Range, camp site above Kotanica, Jul 1961, **van Royen 6204 & Sleumer* (BRI). **Papua New Guinea.** Milne Bay Province: track between Ailuluai & Agamoia, S. Fergusson Island, Nov 1976, **Croft et al. LAE68624* (BRI). **Queensland.** Cook District: Home Rule, base of Mt Hedley, 3 km E of Rossville, Apr 1999, *Forster PIF24254 & Booth* (A, BRI, CNS, MEL); Home Rule Lodge, Wallaby Creek, Jun 1996, *Jago 4018* (BRI); T.R. 165, near Home Rule, Wallaby Creek, Jun 2005, *Forster PIF30985 & Jensen* (BRI, CNS, MEL); Parrot Creek, 1973, *Dick sub Webb & Tracey 13539* (CNS); 9.6 km S of Rossville, near highest point of the Gap on Wujal Wujal Road, Dec 1989, *Jessup GJD3088 et al.* (BRI); Gap Creek, *c.* 22 miles [37 km] S by E of Cooktown, May 1969, *Smith s.n.* (BRI [AQ339996]); 0.5 miles [0.8 km] W of Cedar Bay, Bloomfield River area, May 1969, *Webb & Tracey 8959* (BRI); near summit of Mt Misery, Dec 1989, *Jessup GJD3145 et al.* (BRI); Oliver Creek, a tributary of Noah Creek, Cape Tribulation, May 1972, *Webb & Tracey 11572* (CANB, CNS); Mossman, Aug 1948, *Smith 3938* (BRI); S.F.R. 141, headwaters of Little Mossman River, off Mt Perserverence road, Feb 2003, *Ford AF3820* (BRI, CNS); Churchill Creek, Churchill L.A., S.F. 143, Jul 1995, *Forster PIF17202 & Figg* (BRI); Danbulla S.F.R., *c.* 15 miles [25 km] E of Tinaroo, Aug 1963, **Schodde 3306* (BRI, CANB); 12 km NE of Yungaburra, Scientific Area 30, E end of Severin L.A., S.F. 185, Oct 1988, *Jessup GJM5220* (BRI); Gadgarra S.F., vicinity of Gadgarra Red Cedar, Nov 1994, *Hunter JH1314* (BRI); ridgeline with view to West Mulgrave Falls, Jan 1995, *Hunter JH275* (BRI); West Mulgrave River, Apr 1995, *Hunter JH3265* (BRI); Malanda, Jan 1918, *White s.n.* (BRI [AQ125333]); Elinjia L.A., 7.4 km NE of Millaa Millaa, Oct 1988, *Jessup GJM5227* (BRI); Henrietta Creek, Tchupalla Falls, Palmerston N.P., Jun 1997, *Forster PIF21250* (BRI, CNS); Russell River, lower mid-reaches, Jan 1995, *Hunter JH2129* (BRI); Miriwinni near Mt Bartle Frere, 1962, *Webb & Tracey 6677A* (BRI). North Kennedy District: Nitchaga Road, S.F.605, S of Koombooloomba, Jan 2004, *McDonald KRM1709 et al.* (BRI); S.F.R. 344, Kirrama Road, 2 km NNW of Mt Collins, Jun 2002, *Ford AF3477* (BRI, CNS).

***Distribution and habitat*:** The Australian populations of *Amaracarpus nematopodus* are wholly within the Wet Tropics bioregion of north-east Queensland with a northern limit at Home Rule and a southern limit at the Kirrama Range. Plants occur in the understorey of wetter rainforests (complex notophyll to mesophyll vineforests) on diverse substrates (often alluvial/colluvial in origin), e.g. basalt, chert, granite, metamorphics, mudstone, at altitudes between 10 and 1100 m.

***Notes*:** The definition of *Amaracarpus heteropus* by Davis & Bridson (2004) covers some diverse material from a wide range of localities and habitats in New Guinea, albeit all from coastal localities (altitudes 10–780 m), often in swamps or along watercourses.

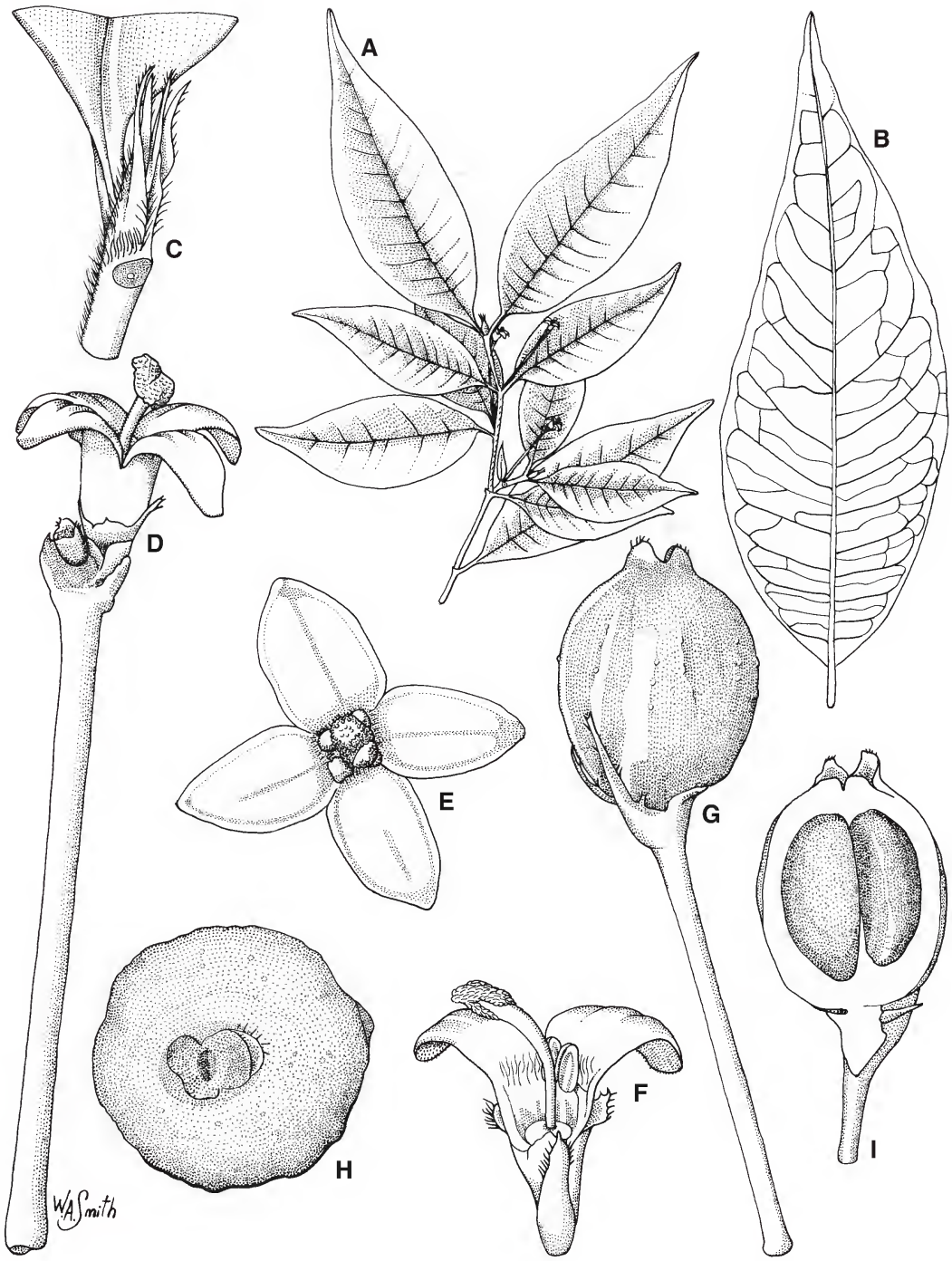

Fig. 1. ***Amaracarpus nematopodus***. A. branchlet × 0.5. B. abaxial leaf surface showing 1–3° venation × 1. C. node with stipule × 3. D. inflorescence with flower × 6. E. face view of flower showing style head and 4 stamens × 8. F. side view of flower with corolla lobes cutaway showing style with stigmas and two stamens × 8. G. inflorescence with fruit showing persistent subtending bracts × 6. H. apical view of fruit × 8. I. vertical cross-section of fruit showing carpology × 6. All from *Forster PIF25254 & Booth* (BRI). Del. W.Smith.

Their defining features for this species are the stipules with 2 setae, the leaf lamina greater than 2 cm (usually more than 4.5 cm) long and with 8–10 pairs of secondary lateral veins; and the inflorescences pedunculate, (1–)3–7(–8)-flowered. This species is most similar to *A. attenuatus* Merr. & L.M.Perry; however, that species has deeply bifid stipules and leaf lamina with 10–14 pairs of secondary lateral veins. They included the two species in different species subgroups (that they openly admit are probably artificial) based solely on the stipule difference.

Amaracarpus nematopodus is likely to be confused with Australian species of *Psychotria*; however, it can be distinguished by the leaves arranged in the same plane as the branches, the monopodial shoot growth pattern, stipules with two setae (Davis & Bridson 2004) and the red fruit (versus cream, yellow or white) as first described by Bailey (1900: 771).

Conservation status: *Amaracarpus nematopodus* is widespread throughout the Wet Tropics of Queensland and usually common where it occurs. The majority of extant populations are in the conservation reserve estate (State Forests, Forest Reserves, National Parks) and the species should be considered as **Least Concern** in terms of Queensland legislation.

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Notes on *Zornia* J.F.Geml. 1: a new species from north Queensland, and a new synonym

Ailsa E. Holland

Summary

Holland, A.E. (2010). Notes on *Zornia* J.F.Geml. 1: a new species from north Queensland, and a new synonym. ***Austrobaileya* 8(2): 159–163.** A new species, *Zornia macdonaldii* A.E.Holland is described and illustrated, with notes on its distribution, habitat and conservation status. A table of differences between *Z. macdonaldii* and closely related species is provided. *Zornia pedunculata* S.T.Reynolds & A.E.Holland is newly synonymised under *Z. dyctiocarpa* DC.

Key Words: Fabaceae, *Zornia*, *Zornia dyctiocarpa*, *Zornia macdonaldii*, *Zornia pedunculata*, Australia flora, Queensland flora, taxonomy, new species

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Introduction

The genus *Zornia* J.F.Geml. is a pantropical genus with more than 75 species worldwide (Mohlenbrock 1961), including seventeen species from Australia (Reynolds & Holland 1989). Thirteen of these species are known to occur in Queensland (Holland & Pedley 2007), including seven endemics. Most species occur in seasonally dry areas of northern Australia. Considerable additional material has been collected since 1989, including specimens of the species described herein.

Materials and methods

This study is based on the examination of herbarium material from the Queensland Herbarium (BRI) and observations of plants in the field. Measurements are based on dried herbarium material, including all specimens cited. Length by width dimensions are indicated as length × width followed by the measurement unit.

Taxonomy

Zornia macdonaldii A.E.Holland, **species nova** affinis *Z. floribundae*, *Z. chaetophorae* et *Z. stirlingii*; a prima bracteis magis glandularibus et in articulis setis longioribus, a secunda articulis minoribus setis minoribus praeditis et ab extrema bracteis multo minoribus et magis separatis differt. **Typus:** Queensland. Cook District: Newcastle Range, 0.7 km by road W of Routh Creek bridge, 1 May 2006, *K.R.McDonald KRM5258* (holo: BRI; iso: CANB; NSW).

Erect slender annual to 60 cm high. Stems often branched from near base, glabrous, sparsely gland-dotted. Leaflets, bracts and stipules often deciduous. Petioles (5–)10–24 mm long, shorter than the leaflets. Leaflets 2, linear, often conduplicate when dry, (11–)15–38 × 0.5–2 mm, glabrous or with a few strigose hairs along the midrib, minutely gland dotted; apex and base acute. Stipules lanceolate, 5–13 × 1–1.6 mm, glabrous, minutely gland dotted, 5-nerved, reticulate venation obscure; apex acuminate; base produced into a narrow acute spur 1.5–3.8 mm long. Inflorescences 7–25 cm long with 2–17 flowers, the upper few crowded, the lower ones separated by up to 20 mm. Peduncles 2–9 cm long, glabrous, minutely gland dotted. Bracts obovate, (5–)7–11 × (1.5–) 2–3.5 mm; face glabrous or with a few scattered short hairs, gland-dotted, 5-nerved, reticulate veined; margin ciliate with hairs to 0.7 mm long; apex acute; base produced into an acute, obtuse or bi-lobed spur 1.2 –2.2 mm long. Calyx 3–4 mm long, ciliate. Petals yellow; standard ±orbicular, 7–10 mm diam.; wings obovate, curved upwards, 5–7 × *c.* 4 mm, with a 2 mm claw; keel sharply bent upwards, 5–8 mm long. Fruits 2–5-articulate,

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exserted; articles 2–2.8 × 1.8–2.1 mm; face puberulent on the outer edge, prominently reticulate with reddish-brown veins, scattered raised glands present; bristles present, 0.8–1.6 mm long, puberulent with short retrorse hairs. Seed *c.* 1.5 × 1 mm. **Fig. 1.**

***Additional selected specimens examined*: Queensland.** Cook District: Newcastle Range, 70 km by road from Mt Surprise, Apr 2006, *McDonald KRM5119* (BRI, NSW); 16.2 km W of Herberton, near junction of Petford – Herberton – Irvinebank Roads, Feb 2006, *McDonald KRM4883* (BRI, NSW); W of Herberton, Apr 2004, *Wannan 3442 & Dorricott* (BRI, NSW); Stannary Hills, 13 km S of Mutchilba, Portion 603, May 2006, *Forster PIF31625 & McDonald* (BRI); 1.5 km along Sundown Road to Almaden/ Mt Surprise off Kennedy Highway, May 2006, *Forster PIF31485 & McDonald* (BRI); 1.1 km from Collins Weir, SW of Mareeba, Apr 2004, *McDonald KRM1951 & Covacevich* (BRI); Bulleringa N.P., 80 km NW of Mt Surprise, Apr 1998, *Forster PIF22647 & Booth* (BRI); 15 km E of Georgetown on Gulf Developmental Road, Apr 1990, *Batianoff 900400H & Smith* (BRI); 6.5 km S of Herberton, Jan 2004, *Addicott EA1174* (BRI); 20 km NW of Mt Garnet, on road to Lappa, Jan 1993, *Bean 5485 & Forster* (BRI); Dimbulah – Wolfram Road, 6.8 km from Bullaburrah Creek Road, Mar 2002, *Ford AF3305* (BRI, NSW); 26.4 km towards Forsayth from Einasleigh, Newcastle Range, Mar 2005, *McDonald KRM3799* (BRI); 24.8 km along Almaden Road from junction with Gulf Developmental Road, Fifteen Mile Range, May 2004, *McDonald KRM2589* (BRI); O'Briens Creek Road crossing, O'Briens Creek fossicking area, N of Mount Surprise, May 2004, *McDonald KRM2530* (BRI); Irvinebank turnoff on the Herberton to Petford Road, Apr 2001, *Jago 5836 & Wannan* (BRI). North Kennedy District: *c.* 37 km SW of Mount Garnet, on road to Mount Surprise, Apr 1973, *Henderson H1706* (BRI); State Forest 754, near Ravenshoe, Apr 1999, *McDonald 34* (BRI); 2.1 km along Hollands Road, W of Tomoulin, May 2000, *Bean 16586* (BRI).

***Distribution and habitat*:** *Zornia macdonaldii* is restricted to an area in north Queensland between Mareeba and Forsayth (**Map 1**). It is found on hills in mixed open eucalypt woodland dominated by *Eucalyptus*, *Corymbia, Allocasuarina* or *Erythrophleum* species with sparse understorey, on rocky, gravelly or sandy soil over granite or rhyolite.

***Phenology*:** This species flowers and fruits between January and May depending on rainfall.

***Notes*:** *Zornia macdonaldii* is part of a species group including *Z. floribunda* S.Reyn. & Holland, *Z. stirlingii* Domin, and *Z. chaetophora* F.Muell. This group differs from all other Australian *Zornia* species by the erect habit and linear leaflets. Within this group, *Z.macdonaldii* differs from *Z.floribunda* by the smaller, glandular and more separated bracts, and the much longer bristles on the articles; from *Z. stirlingii* by the much smaller and more separated bracts; and from *Z. chaetophora* by the smaller articles and shorter article bristles. Other differences are summarised in the table below (**Table 1**).

***Conservation status*:** *Zornia macdonaldii* is common in the area and not currently threatened.

***Etymology*:** This species is named after Keith McDonald who has made extensive collections and photographs of the north Queensland legume flora.

Zornia dyctiocarpa DC. var. **dyctiocarpa**

Zornia pedunculata S.T.Reynolds & A.E.Holland, *Austrobaileya* 3: 28 (1989), ***syn. nov.*** **Type:** Queensland. Port Curtis District: 60 km SW of Gladstone, Kroombit Tableland, tributary of Kroombit Creek, 3.2 km SSW of Amy's Peak, 4 June 1977, *M.D.Crisp 2766* (holo: BRI).

Discussion

Zornia pedunculata was originally described on the basis of a single specimen from the Kroombit Tableland SW of Gladstone (Reynolds & Holland 1989: 28). The inflorescences on this specimen were consistently 1-flowered. Recent additional material collected from the area (*Hines HH3*, *HH4*; *Mathieson MTM0631*, *MTM0627*) all have inflorescences with 1–5 flowers. The origin of the type material with only 1-flowered inflorescences is possibly due to grazing of tender young shoots, or infrequent mowing, creating the artificially shortened inflorescences. The other characters mentioned by Reynolds & Holland (1989), namely the peduncle length, the ovate leaflets, the glabrous fruits with short or absent bristles, are all well within the range of *Z. dyctiocarpa*. For example, a specimen from near Nanango (*R.H.Watson s.n.* (BRI)), cited under *Z. dyctiocarpa* var. *dyctiocarpa* in that study, is similar to the type material in all characters except the number of

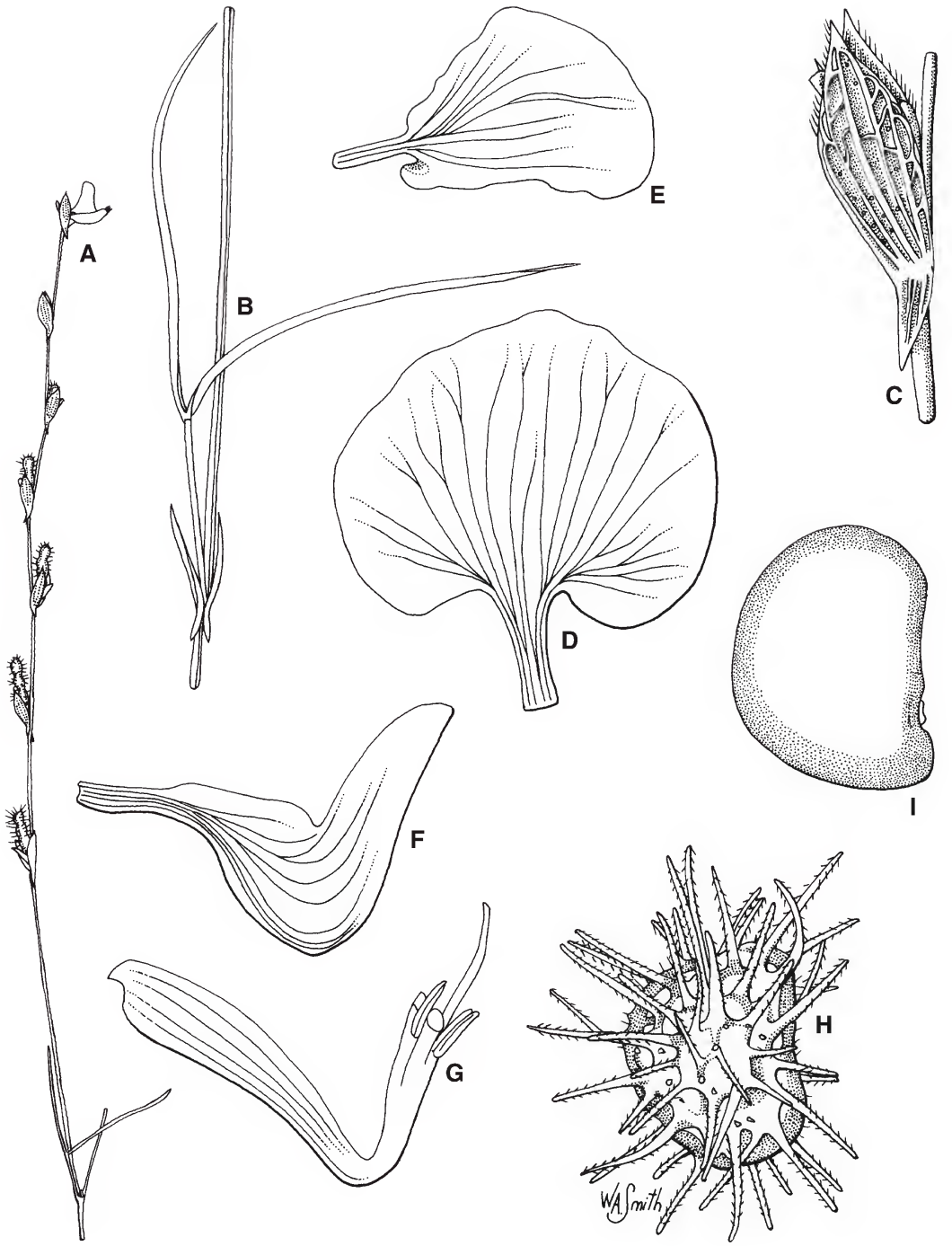

Fig. 1. *Zornia macdonaldii*. A. habit and inflorescence × 0.8. B. leaf with attachment to stem × 2. C. bract × 12. D. standard petal (inside) × 8. E. wing petal (inside) × 8. F. keel petal × 8. G. anther column and style × 8. H. article of fruit × 12. I. seed × 24; A–C & H–I from *McDonald KRM4883* (BRI); E–G from *McDonald KRM5258* (BRI). Del. W.Smith.

Table 1. Comparison of morphological characters for *Zornia macdonaldii* and allied species

Character	*Z. macdonaldii*	*Z. floribunda*	*Z. stirlingii*	*Z. chaetophora*
Stem glands	present	absent	present	present
Leaflet length	(11–) 15–38 mm	26–40 mm	(25–) 40–65 mm	15–40 mm
Leaflet width	0.5–2 mm	1–2.5 mm	1.5–4 (–5.5) mm	1–6 (–10) mm
Stipule width	1–1.6 mm	1.5–2 mm	1.5–3 mm	1–5 mm
Bract separation	separated	separated to overlapping	overlapping	separated
Bract length	(5–) 7–11 mm	(7–) 11–12 mm	13–24 mm	(5–)7–11 mm
Bract width	(1.5–) 2–3.5 mm	3–5 mm	4–8 mm	2–3.5 mm
Bract glands	present	few or absent	present	present
Article length	2–2.8 mm	2–2.5 mm	2.5–3 mm	2.2–2.8 mm
Article bristle length	0.8–1.6 mm	0–0.5 mm	0.5–2 mm	3–5 mm

flowers. *Zornia pedunculata* S.T.Reynolds & A.E.Holland is therefore here placed in synonymy under *Z. dyctiocarpa* DC. var. *dyctiocarpa*.

Note that the leaflet length 0.9–19 cm reported in Reynolds & Holland (1989: 28) is an error and is correctly 0.9–1.9 cm.

Acknowledgements

I thank Keith McDonald (Department of Environment and Resource Management) for collecting so many quality plant specimens and providing habitat information and comments. I also thank Peter Bostock for the Latin diagnosis and map, and Will Smith for the illustration.

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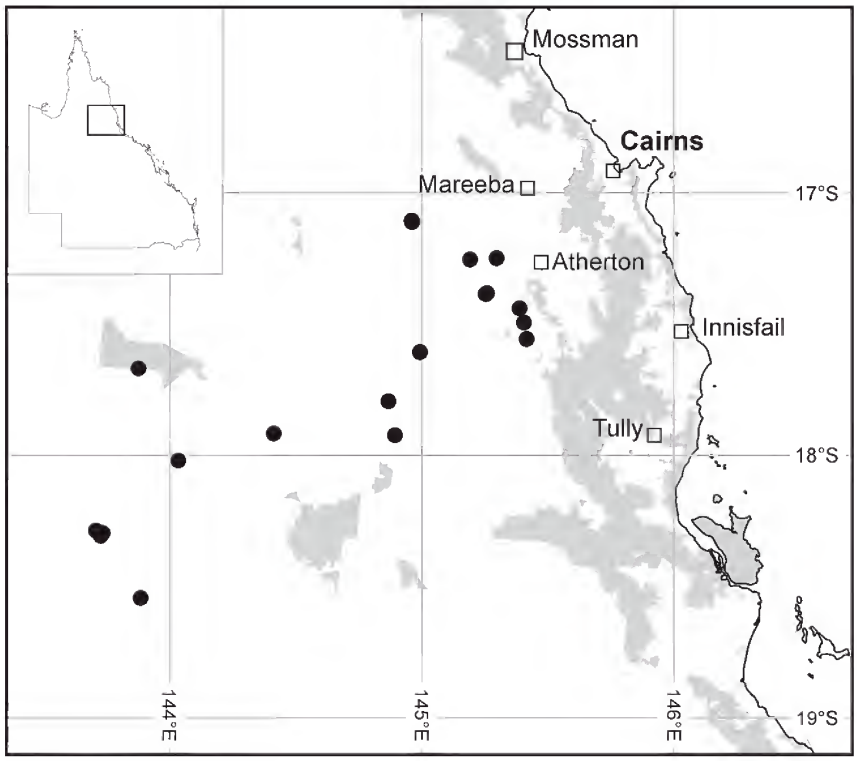

Map 1. Distribution of *Zornia macdonaldii*

Two new species of *Solanum* L. (Solanaceae) from central Queensland

A.R.Bean

Summary

Bean, A.R. (2010). Two new species of *Solanum* L. (Solanaceae) from central Queensland. ***Austrobaileya* 8(2): 165–170.** *Solanum pisinnum* A.R.Bean sp. nov. and *S. orgadophilum* A.R.Bean sp. nov. from central Queensland are described and illustrated. Notes on affinities, conservation status, distribution, etymology, habitat and phenology are provided.

Key Words: Solanaceae, *Solanum*, *Solanum orgadophilum*, *Solanum pisinnum*, Australia flora, Queensland flora, new species, taxonomy

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Introduction

Solanum L. is represented in Australia by more than 100 species indigenous to the four eastern States (Bean 2005-onwards), and many more in the north and north-west of the continent. While the genus is species-rich, *Solanum* species are rarely prominent in the landscape. Many Australian species are less than one metre high, and the floral displays can be inconspicuous. Often, they occur only in areas recently disturbed by fire or machinery, and are short-lived. For these reasons, *Solanum* distribution, ecology and even taxonomy remain quite poorly known.

Both of the species described in this paper are short-lived perennials, less than 50 cm tall, and of limited distribution. They belong to *Solanum* subgenus *Leptostemonum* (Dunal) Bitter.

Materials and methods

Herbarium specimens at BRI and MEL were examined. Terminology and measurement methods are as in Bean (2004). Measurements of stems, leaves, prickles, hairs and pedicels were made from dried material. Measurements of corolla, style, anthers and fruits were made from material preserved in spirit or reconstituted. Both species have been studied in the field.

Abbreviations: N.P. (National Park).

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Taxonomy

Solanum pisinnum A.R.Bean **species nova** affinis *S. centrali* sed statura minore, aculeorum absentia aequabili, corolla non profunde lobata, corollae pagina interiore valde hirsuta, ovario styloque glabro, inflorescentiis 1–3-floris et fructus exocarpio 1.8–2.3 mm crassitudine differens. **Typus:** Queensland. Mitchell District: 69.8 km from Jericho, along Tumbar Road, 21 May 2009, *A.R.Bean 28966* (holo: BRI; iso: CANB, DNA, MEL, NY).

Erect herbaceous resprouter, 0.2–0.4 m high. Stems without prickles. Branchlets grey, yellow or rusty; prickles absent; stellate hairs very dense, 0.3–0.5 mm diameter, stalks 0–0.2 mm long, lateral rays 7–8, porrect, central ray 0.8–1.5 times as long as laterals, not gland-tipped; type 2 hairs absent. Leaves ovate, entire; lamina 2.8–8.5 cm long, 1.1–4.2 cm wide, 2–2.5 times longer than broad, apex obtuse or acute, base obtuse or cordate; oblique part 0–3 mm long, obliqueness index 0–7 percent; petioles 0.8–2.6 cm long, 18–40% length of lamina, prickles absent. Upper leaf surface grey-green or grey, prickles absent, stellate hairs distributed throughout, dense or very dense 0.05–0.2 mm apart, 0.3–0.65 mm across, stalks 0.1–0.25 mm long, lateral rays 7–8, porrect, central ray 0.4–1.1 times as long as laterals, not gland-tipped; simple hairs absent, type 2 hairs absent. Lower leaf surface white, grey or yellowish, prickles absent;

stellate hairs dense or very dense, 0.05–0.2 mm apart, 0.4–0.7 mm diameter, stalks 0.1–0.3 mm long, lateral rays 7–8, porrect, central ray 0.4–1.1 times as long as laterals, not gland-tipped; simple hairs absent, type 2 hairs absent. Inflorescence supra-axillary, cymose (pseudo-racemose), common peduncle 2–15 mm long, rachis prickles absent, 1–3-flowered. Flowers 5-merous; pedicels at anthesis 4–13 mm long, 0.9–1.3 mm thick, prickles absent. Calyx tube at anthesis 3.5–4.5 mm long; calyx lobes at anthesis deltate, rostrate or attenuate, 2–4.5 mm long; prickles absent; stellate hairs very dense, yellow to rusty, 0.3–0.45 mm across, stalks 0–0.3 mm long, lateral rays 7–8, central ray 0.6–1.2 times as long as laterals, not gland-tipped. Corolla mauve or purple, 10–13 mm long, shallowly lobed, inner surface densely stellate-hairy; anthers 4.3–6.2 mm long, filaments 1.2–1.3 mm long; ovary glabrous; functional style 7.5–9 mm long, protruding between anthers, glabrous. Fruiting calyx lobes less than half length of mature fruit, prickles absent. Mature fruits 1 per inflorescence, globular, 12–17 mm diameter, yellowish-green, 2-locular; placenta sessile, semi-circular; mesocarp moist but not juicy, exocarp 1.8–2.3 mm thick; pedicels at fruiting stage 9–22 mm long, 1.1–1.4 mm thick at mid-point. Seeds pale yellow or brown, 3.1–3.4 mm long. **Fig. 1.**

***Additional specimens examined*: Queensland**. MITCHELL DISTRICT: Idalia N.P., WSW of Blackall, SE of Emmet, along Emmet Pocket Road, Sep 1992, *Bennie s.n.* (BRI [AQ 549761]). WARREGO DISTRICT: Idalia N.P., Round Hole, Mar 1996, *Forster PIF18891 & Ryan* (BRI).

***Distribution and habitat*:** *Solanum pisinnum* is known from two areas; on the Great Dividing Range south of Jericho, and about 200 km further west in Idalia National Park (**Map 1**). At the type locality it grows in *Acacia longispicata* Benth. regrowth, with emergent trees of *Eucalyptus crebra* F.Muell., *E. chloroclada* (Blakely) L.A.S.Johnson & K.D.Hill and *Callitris glaucophylla* Joy Thomps. & L.A.S.Johnson in pale sandy soil. At Idalia N.P., it grows in *Acacia aneura* F.Muell. ex Benth. woodland in red sand.

***Phenology*:** Flowers are recorded in March, May and September; fruits are recorded in May.

***Affinities*:** Included in this species are some specimens that were attributed to *Solanum centrale* J.M.Black by Bean (2004), and *S. centrale* is no longer regarded as being indigenous to Queensland. *Solanum pisinnum* is closely related to *S. centrale*, but differs by the often smaller stature, the consistent lack of prickles, the shallowly lobed corolla (deeply lobed for *S. centrale*), the inner surface of the corolla hirsute throughout distal half (only at apex for *S. centrale*), ovary and style glabrous (both densely clothed in stellate hairs for *S. centrale*), inflorescences with 1–3 flowers and 1 fruit (up to 7-flowered and 4-fruited for *S. centrale*), and pericarp 1.8–2.3 mm thick (0.8–1 mm for *S. centrale*).

***Conservation status*:** The population at the type locality comprises more than 1000 stems, spread over an area of 1–2 hectares. The species was not found in similar habitats nearby, despite active searching. The extent of the species at Idalia N.P. is not known. Under the Red List guidelines (IUCN 2001), a category of "Data deficient" is recommended until further survey work is carried out.

***Etymology*:** The specific epithet is derived from the Latin word *pisinnus,* meaning small or little. This is a reference to the small stature of this species.

Solanum orgadophilum A.R.Bean **species nova** affinis *S. jucundo* sed statura minore, aculeis brevioribus, foliis ovatis usque late ovatis, petiolo longitudine 28–83 centensimas partes laminae aequanti, corollae pagina inferiore glabra et praesentia in solis densis argillaceis differens. **Typus:** Queensland. LEICHHARDT DISTRICT: Kettle Street, Capella, 6 May 2010, *A.R.Bean 29648* (holo: BRI; iso: CANB).

Erect herbaceous resprouter, 0.2–0.4 m high. Adult branchlets white, grey or brown; prickles 1–5 per decimetre, straight, acicular, 1–3.5 mm long, 5–8 times longer than wide, glabrous or with scattered stellate hairs on lower half; stellate hairs dense or very dense, 0.4–0.7 mm diameter, stalks 0–0.15 mm long; lateral rays 7–8, porrect; central ray 0.3–1.3 times as long as laterals, not gland-tipped; type 2 hairs absent. Adult leaves ovate or broadly ovate, margins entire but often

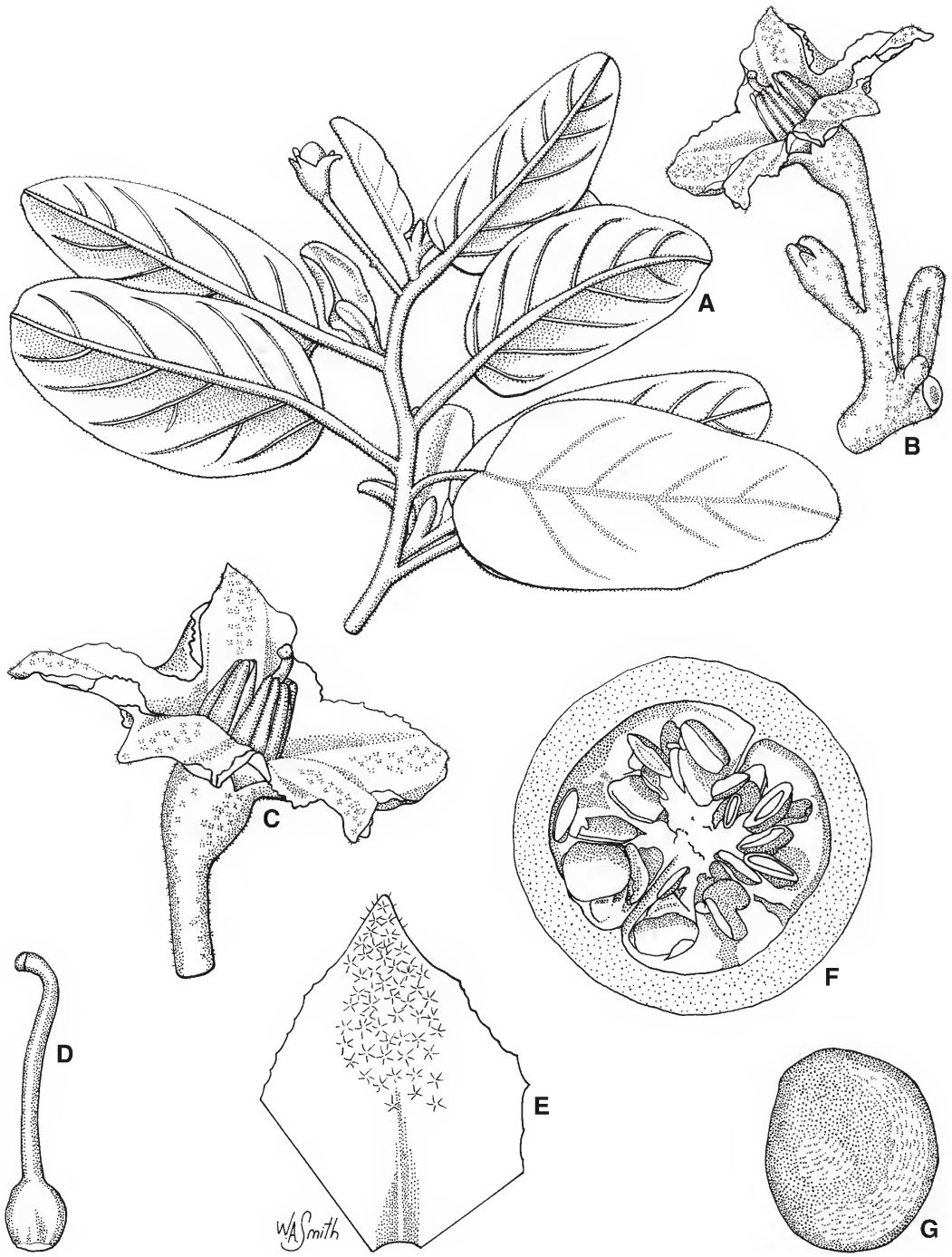

Fig. 1. ***Solanum pisinnum***. A. fertile branchlet × 1. B. inflorescence × 2. C. open flower × 3. D. ovary and style × 8. E. inner surface of corolla × 8. F. cross-section of mature fruit × 3. G. seed × 8. All from *Bean 28966* (BRI). Del. W.Smith.

undulate; lamina 6.5–20 cm long, 3.8–11.7 cm wide, 1.4–2 times longer than broad, apex obtuse or acute, base obtuse or cordate, oblique part 0–2 mm long, obliqueness index 0–2 percent; petioles 3.2–8.4 cm long, 28–83 % length of lamina, prickles absent or rarely present. Upper leaf surface silvery-grey to grey-green, prickles absent; stellate hairs distributed throughout, moderately dense or dense, 0.1–0.25 mm apart, 0.3–0.4 mm across, stalks 0–0.1 mm long; lateral rays 6–8, porrect; central ray 0.2–0.7 times as long as laterals, not gland-tipped; simple hairs absent; type 2 hairs absent. Lower leaf surface white or grey, prickles absent; stellate hairs dense or very dense, 0.05–0.2 mm apart, 0.5–0.7 mm diameter, stalks 0–0.15 mm long; lateral rays 7–8, porrect; central ray 0.3–0.8 times as long as laterals, not gland-tipped; simple hairs absent; type 2 hairs absent. Inflorescence supra-axillary, cymose (pseudo-racemose), common peduncle 30–35 mm long, rachis prickles absent or rarely present, 3–6-flowered. Flowers 5-merous. Pedicels at anthesis 6–11 mm long, same thickness throughout, 0.5–0.9 mm thick at mid-point, prickles absent or rarely present. Calyx with tube 2.5–3.5 mm long; lobes deltate, 2–6 mm long; prickles absent; stellate hairs dense or very dense, brown or rusty, 0.3–0.4 mm across, stalks 0–0.1 mm long, lateral rays 8, central ray 0.8–1.2 times as long as laterals, central ray not gland-tipped; simple hairs absent; type 2 hairs absent. Corolla purple, 13–14 mm long, rotate, inner surface glabrous; anthers 4.8–5.5 mm long; filaments *c.* 1 mm long; ovary with stellate and type 2 hairs. Functional style *c.* 8.5 mm long, protruding between anthers, with stellate hairs only. Fruits not seen. *Capella potato bush*. **Fig. 2.**

***Additional specimens examined*: Queensland.** LEICHHARDT DISTRICT: 4 km SW by road from the Wolfang Access road turnoff, on Moranbah – Clermont Road, May 2006, *Jessup 5241 & Thomas* (BRI, NSW); Peak Downs, *c.* 10 miles [16 km] NE of Capella, Jan 1954, *Everist 19 & Johnson* (BRI); Peak Downs, Jan 1951, *Everist 4398* (BRI); Copella [=Capella], in 1871, *Bowman s.n.* (MEL12574); Emerald, *s.dat.* [1879–1881], *O'Shanesy 40011* (MEL13077).

***Distribution and habitat*:** *Solanum orgadophilum* is confined to the "Central Highlands", from north-east of Clermont to Capella, and was historically recorded from Emerald (**Map 1**). It grows in fertile cracking clay soil on flat or undulating terrain, in association with various grasses and forbs. The original vegetation was probably grassland or eucalypt open woodland.

***Phenology*:** Flowers have been recorded for January and May.

***Affinities*:** *Solanum orgadophilum* belongs to the *S. macoorai* group (Group 27B) of Bean (2004), but is rather taxonomically isolated within this group. It is perhaps closest to *S. jucundum* A.R.Bean, although many characters separate them, including plant height, prickle length, leaf shape, corolla indumentum and habitat. *Solanum orgadophilum* is somewhat reminiscent of *S. ellipticum* R.Br., but differs from it by the upright habit, the lack of prickles on the leaves and calyx, and the style covered by many stellate hairs. In the dichotomous key of Bean (2004), *S. orgadophilum* will most often key out to *S. argopetalum* A.R.Bean; however, that species has Type 2 hairs on the branchlets, much larger stellate hairs on the upper leaf surface with a longer central ray, common peduncle absent or very short, and a smaller white corolla.

***Conservation status*:** The great majority of the habitat for this species has been utilised for cropping, and more recently further land has been taken for open-cut coal mining. Currently, the species is locally common on two freehold properties within the township of Capella. One population is on a vacant block where a building is to be erected in the next few years, while the other is in the backyard of an existing house, which is grazed and intermittently slashed.

A population, comprising up to 500 stems, was discovered on a road reserve on the Clermont – Moranbah road in 2006, but no plants have been seen there since 2008, as dense swards of tall grass now cover the site. Presumably the rhizomes of the *Solanum* are still alive at this site. It is not known whether the species still exists at "Peak Downs".

Threats to the species include land modification (cropping, coal mining and

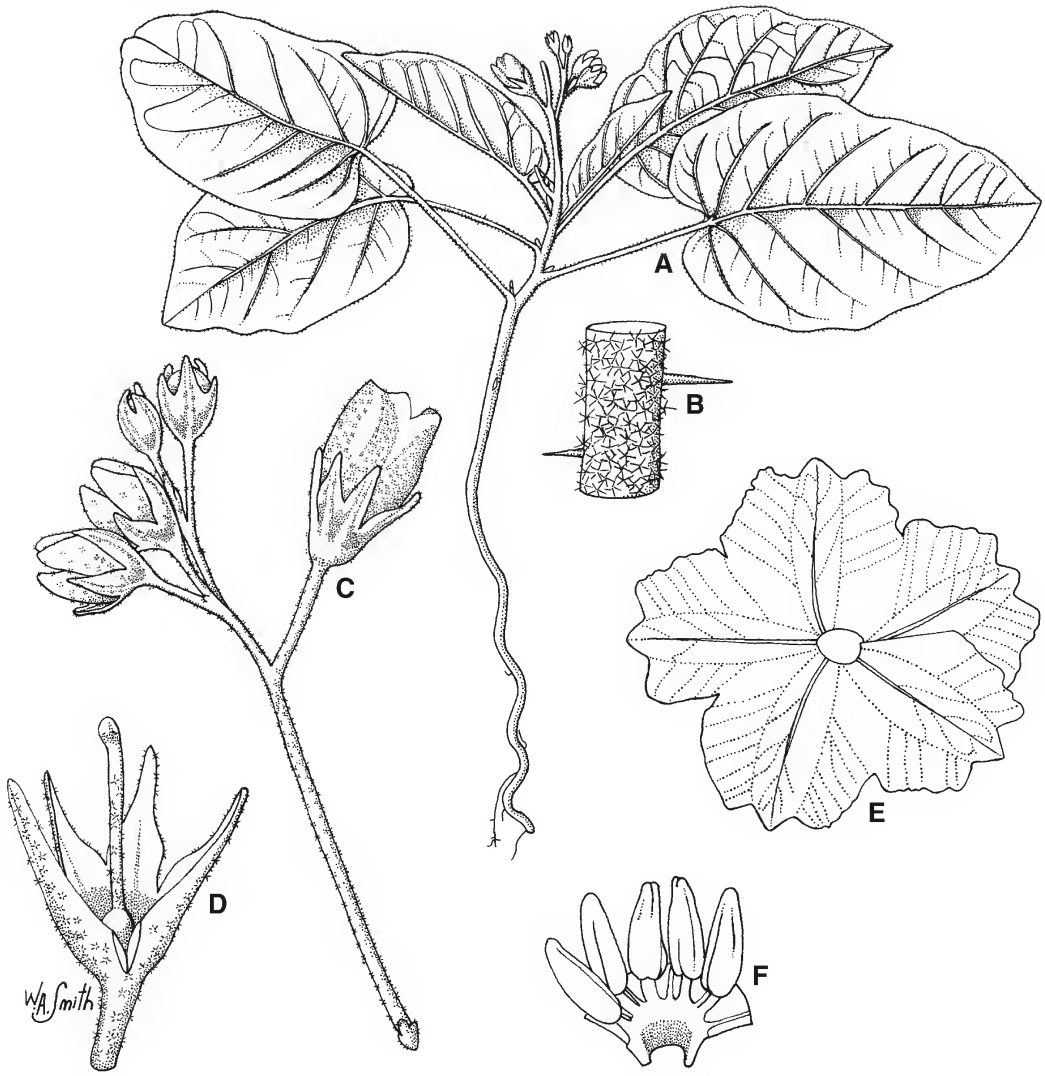

Fig. 2. ***Solanum orgadophilum***. A. whole plant × 0.4. B. portion of stem showing prickles × 6. C. inflorescence × 1.5. D. calyx (one lobe removed), ovary and style × 3. E. corolla × 2. F. stamens × 3. All from *Bean 29648* (BRI). Del. W.Smith.

urban development) and weed encroachment (especially *Parthenium hysterophorus* L.). The recommended conservation status using the Red List criteria (IUCN 2001) is **Endangered** based on the criteria B1a,b(ii,iii,v)c(ii,iv)+2a, b(ii,iii,iv,v)c(ii,iv); C1+2b.

***Etymology*:** The species epithet is from the Greek *orgados* (a meadow or well-watered fertile spot), and *philos* (loving). This is a reference to the habitat of this species.

Acknowledgements

I am grateful to Kate and Julienne Brimblecombe of Capella for publishing in a local newsletter my article about Capella potato bush. Capella residents Ren Lanyon and Reni Isherwood kindly showed me some solanum plants in the town. Peter Bostock translated the diagnoses into Latin and Will Smith provided the illustrations.

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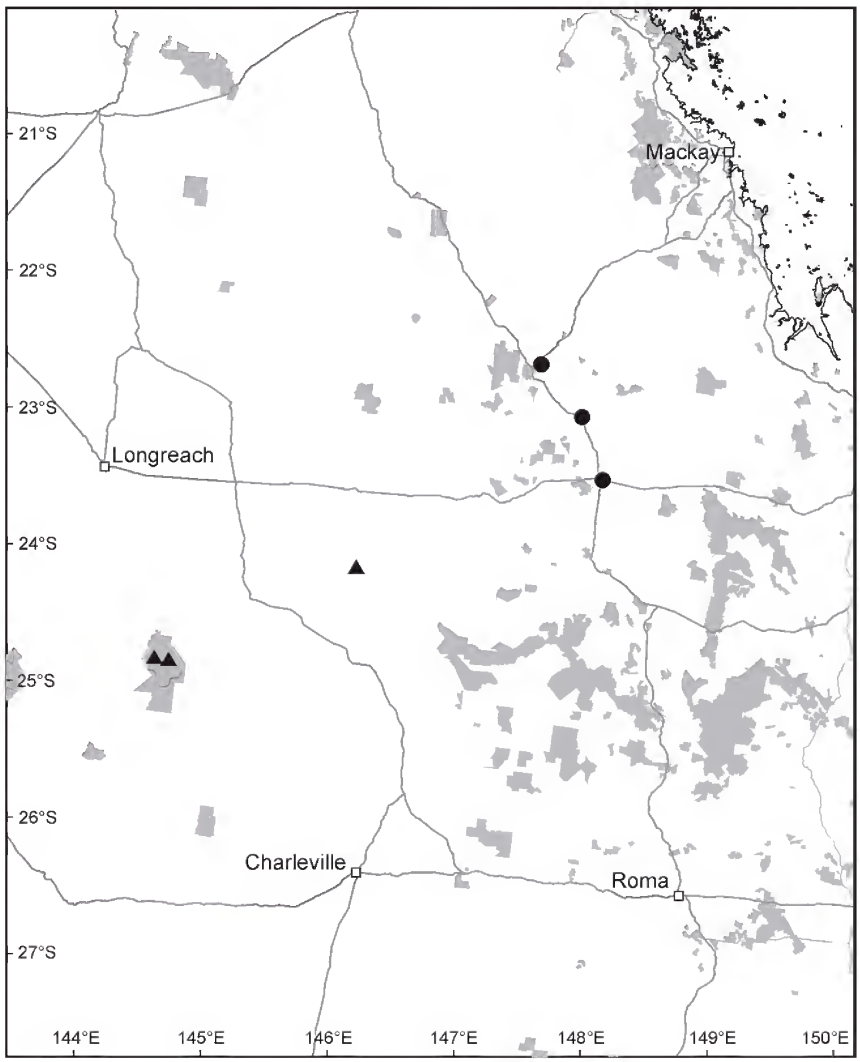

Map 1. Distribution of *Solanum pisinnum* (▲) and *S. orgadophilum* (●)

Davenportia R.W.Johnson, a new genus of Convolvulaceae (*Merremieae*) from central Australia

R.W.Johnson

Summary

Johnson, R.W. (2010). *Davenportia* R.W.Johnson, a new genus of Convolvulaceae (*Merremieae*) from central Australia. ***Austrobaileya* 8(2): 171–176.** *Davenportia* R.W.Johnson is described as new. It differs from existing genera in the tribe *Merremieae* in its pollen morphology, hair type and bracteoles. *Ipomoea davenportii* F.Muell. is transferred to the new genus with the new combination *Davenportia davenportii* (F.Muell.) R.W.Johnson. Descriptions, illustrations and a distribution map are provided for *Davenportia* and its sole species.

Key Words: Convolvulaceae, *Davenportia*, *Davenportia davenportii*, *Merremia*, Australia flora, new genus, taxonomy

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Introduction

Mueller (1868) described *Ipomoea davenportii* F.Muell. from a specimen collected by J.McDouall Stuart on the Davenport Range, Northern Territory. He highlighted its stellate tomentum on the foliage. Bentham (1869) noted that the fragmentary specimen he studied was very different from other species of *Ipomoea*. Hallier (1893) transferred *Ipomoea davenportii* to *Merremia* Dennst. ex Endl. on the basis of its smooth pollen.

Merremia davenportii has always fitted uncomfortably within the genus *Merremia* and is worthy of generic rank based on the presence of hexapantoporate pollen (the primary distinguishing character), stalked multiangulate stellate hairs and large bracteoles.

Taxonomy

Davenportia R.W.Johnson, **genus novus** differt ab omnibus aliis generibus in Convolvulaceis combinatione characterum sequentium: styli singulares, indivisi, stigmata globosa, pollinis grana laevia pantocolpata, pili stellati et bracteolae prominentes. **Typus:** *Davenportia davenportii* (F.Muell.) R.W.Johnson.

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Herbaceous perennial vines with stalked, multiangulate stellate hairs; stems trailing and climbing, twining at the tips. Leaves petiolate, compound; leaflets crenate or lobed. Inflorescence an axillary, 1–few-flowered cyme; bracteoles prominent, persistent. Sepals 5, free, herbaceous, ±equal. Corolla funnel-shaped, white; limb shallowly 5-lobed; mid-petaline bands distinctly veined and glabrous outside. Stamens 5, included; filaments at the base adnate to the corolla tube; anthers straight; pollen 6-pantocolpate, smooth. Disk annular. Ovary glabrous, 4-locular; ovules 1 per locule; style 1, entire; stigma biglobular. Fruit capsular, globular to depressed globular, 4-valved; 4-seeded. Seeds smooth, sericeous.

***Distribution*:** *Davenportia* is a monospecific genus, endemic in Australia.

***Relationships*:** *Davenportia* possesses a single style and globose stigmas, pinnate venation and a capsular fruit and can be classified within the tribe *Merremieae* D.F.Austin. Austin (1973) informally proposed a tribal grouping, "Merremioides", to include the genera *Merremia*, *Aniseia* Choisy and *Operculina* Silva Manso, all which occur in Australia. He suggested this group had common ancestry with the *Ipomoeeae* Hallier f. and *Argyreieae* Choisy ex G.Don. Austin (1982) formally described the tribe *Merremieae*; however, Stefanovic

et al. (2002) demonstrated that the tribe was not monophyletic and transferred *Aniseia* and some tropical American genera to a new tribe *Aniseieae* Stefanovic & D.F.Austin. Further studies indicated the genera remaining in the tribe *Merremieae*, mainly of the old world tropics, may also not be monophyletic (Stefanovic *et al.* 2003).

The type genus of the tribe *Merremieae* is *Merremia*. Austin & Staples (1980) described a new genus *Xenostegia* D.F.Austin & Staples based on *Merremia* section *Halliera* O'Donell. *Davenportia* is another segregate of *Merremia* that is sufficiently distinct to warrant generic rank.

***Diagnostic Characters*:** The following characters separate *Davenportia* from other members of the tribe *Merremieae*.

Pollen. Pollen morphology has played an important role in the classification of genera in the family Convolvulaceae (Ferguson *et al.* 1977). Pollen grains of *Davenportia* are smooth, spheroidal and hexapantocolpate (**Fig. 1**). The polar axis ranges from 60–70µ long; the equatorial diameter 65–70µ. The colpus length ranges from 25–55µ and width from 4–10µ. Ferguson *et al.* (1977) did not record pantocolpate pollen in the 55 species of *Merremia* and *Operculina* they studied. They did, however; record *Merremia davenportii* as having tricolpate pollen. Numerous SEM images of pollen of *Davenportia* showed that from some angles the pollen may appear tricolpate. Measurements from 10 sample pollen grains all showed the pollen was hexapantocolpate, though the possibility exists that some tricolpate grains may occur. Telleria & Daners (2003) also recorded no pantocolpate pollen in *Merremia* in their study of southern New World Convolvulaceae. However, Leite *et al.* (2005) found occasional pantocolpate pollen grains in some typically tri-zonocolpate members of *Merremia* section *Cissoides* O'Donell from South America.

Vestiture. The presence of stellate hairs, which in this case are stalked and multiangulate with numerous arms, distinguishes this taxon from all others species of *Merremia* in Australia and South East Asia. Stellate hairs are rare, but not unknown in *Merremia* species from

Fig. 1. Pollen grain of ***Davenportia davenportii*** from *Wilson 4717* (BRI).

elsewhere. A new genus *Astromerremia* Pilg. was erected by Pilger (1936) on the basis of it having stellate indumentum. Pilger listed only one species from Angola in his new genus inferring no other species of *Merremia* had stellate hairs. Verdcourt (1958) stated that if stellate hairs were the chief reason for separating *Astromerremia* from *Merremia* then he considered it difficult to maintain the new genus. He did conclude that the new species had previously been described from Angola as *Merremia stellata* by Rendle (1908) and sank the new genus. Rendle stated that it was the only *Merremia* with stellate hairs. Its hairs are stalked, multiangulate, with numerous arms. Austin & Staples (1983) reported the presence of stellate hairs in a few species from South America. They described *M. repens* which has simple to 3-branched stellate hairs and commented that stellate hairs were seen in some varieties of *M. digitata*. Simao-Bianchini & Pirani (1997) describe a number of species of *Merremia* from South America with stellate hairs but all have tricolpate pollen and small bracteoles. Stalked stellate hairs do occur in a number of other genera in Convolvulaceae.

Bracteoles. The bracteoles of the Australian species of *Merremia* are small, up to about 5 mm long. In *M. davenportii* they are prominent and 6–20 mm long. In Malaysia

some species of *Merremia* section *Hailale* Hallier f. may have foliaceous bracteoles (van Ooststroom 1953). However, their hairs are not stellate and their pollen is uniformly 3-colpate (Ferguson *et al.* 1977). The South American species referred to above all have smaller bracteoles.

***Notes*:** *Merremia* has long been regarded as a morphologically diverse genus (Austin 1973; Austin & Staples 1980) and the limited molecular evidence to date indicates the internal disposition of genera in *Merremieae* to be unresolved (Stefanovic *et al.* 2002, 2003). It is apparent that a number of character states have evolved independently across the wide pantropical range of the genus. Stellate hairs of various structures have evolved independently in Africa, Australia and South America. This supports the argument presented by Verdcourt (1958) that erection of the genus *Astromerremia* on the basis of stellate hairs alone is not sustainable. The evolution of hexapantoporate pollen in *Davenportia* in Australia has not been previously reported in *Merremia* throughout Africa and Australasia. The occasional occurrence of some pantocolpate pollen in a few zonocolpate species in South America is further evidence of independent evolutionary trends. The combination of hexapantoporate pollen (the primary distinguishing character), stalked multiangulate stellate hairs and large bracteoles represents an independent evolutionary development which clearly warrants recognition as a new genus. Similar character suites have been used to justify the erection of other Convolvulaceae genera such as *Xenostegia* (Austin & Staples 1980) and *Odonellia* Robertson. As noted by Robertson (1982) many genera in the Convolvulaceae have been defined on single or few characters, reflecting many instances of reticulate and/or convergent evolution.

***Etymology*:** The name of this genus is derived from the specific epithet, *davenportii*, which was used by Mueller in recognition of the locality 'Davenport's Range', from which the type specimen was collected. The Davenport Range is named after the wealthy landowner and parliamentarian Sir Samuel Davenport (1818–1906) (Nicks 1972).

Davenportia davenportii (F.Muell.) R.W. Johnson **comb. nov.**; *Ipomoea davenportii* F.Muell., *Fragm.* 6: 97 (1868), as *I. davenporti.* **Type:** "Davenport's Ra." [Davenport Range, Northern Territory], *s.dat.*, *J.M.Stuart s.n.* (holo: MEL2288129).

Merremia davenportii (F.Muell.) Hallier f., *Bot. Jahrb. Syst.* 16: 552 (1893), as *M. davenporti*

Perennial, becoming woody at the base; stems trailing to climbing, twining at the tips, densely stellate hairy, hairs stalked, multiangulate with many arms to 1 mm long. Leaves petiolate; petiole 4–35 mm long; blade trifoliate, appearing almost 5-partite with lateral leaflets deeply lobed on the outer margin; leaflets petiolulate; petiolules 1–8 mm long; terminal lobe elliptic to obovate, occasionally ovate-elliptic, 12–50 mm long, 10–30 mm wide, base tapering, occasionally obtuse, margin crenate, occasionally shallowly lobed, apex obtuse to rounded, emarginate, mucronulate, densely stellate hairy, pinnately veined with 4–8 pairs of secondary veins; lateral lobes similar but shorter and with a distinct basal lobe on the outer margin. Inflorescence axillary, cymose, 1, rarely 2-flowered; peduncle 6–40(–60) mm long; bracteoles opposite, linear to narrowly elliptic or obovate, occasionally ovate, 6–25 mm long, 1–5 mm wide, finely acute to long-acuminate, densely stellate; pedicels 10-30 mm long, dilated upwards. Sepals subequal, ovate to ovate-lanceolate, 12–25 mm long, 5–7 mm wide and up to 10 mm wide at fruiting, apex acute to long-acuminate, densely stellate; inner sepals with a distinct glabrous scarious margin. Corolla funnel-shaped, *c.* 30 mm long, 20–40 mm diameter, white; petals 35–45 mm long, midpetaline band glabrous, with 5 dark nerves. Stamens 5; filaments adnate to the base of the corolla tube for 4–7 mm, free for 10–18 mm, hairs simple occurring on fused area and to above the point of attachment; anthers narrow oblong-lanceolate, sagittate, 4–4.5 mm long, splitting longitudinally; pollen smooth, pantocolpate with 6 colpi. Style 20–30 mm long, glabrous; stigma biglobular. Capsule globular to depressed globular, 6–12 mm long, 9–14 mm diameter, straw-coloured, glabrous, 4-celled, splitting longitudinally

into 4 valves; seeds dark brown to black, ± globular, 5–6 mm long, densely sericeous, hairs to 0.75 mm. **Fig. 2**.

***Additional specimens examined*: Western Australia.** *c.* 10 km S of Boodarie Homestead on track from PWD water tanks, Apr 1995, *Mitchell PRP311* (BRI); Barn Hill Homestead, Apr 1993, *Mitchell 3023* (BRI). **Northern Territory.** Dixon Creek, 9.2 km N of Devils Marbles, May 2005, *Bean 23827* (BRI); Morphett Creek, Mar 1955, *Chippendale 995* (BRI); Stuart Highway, 12 km S Newcastle Waters turnoff, Oct 1995, *Cowie 6078* (BRI); Burrabelly waterhole, Fre River, Feb 1972, *Dunlop 2494* (BRI); 10 km N of Elliott, Nov 1993, *Egan 2856* (BRI); near Wycliffe Well, *c.* 236 miles [380 km] N of Alice Springs, Jan 1950, *Everist 4262* (BRI); 10 miles [16 km] N of Elliott, Stuart Highway, Jan 1968, *Latz 98* (BRI); 27 km W of Barkly homestead on Barkly Highway, Jun 2004, *McKenzie RAM04/68* (BRI); 8 miles [13 km] N of Elliott, Nov 1969, *Parker 127* (AD); 22 miles [35 km] ESE of Frewena Station, Apr 1948, *Perry 670* (BRI); 20 miles [32 km] NW of Ooratippra Station, Mar 1953, *Perry 3429* (BRI); 50 miles [80 km] W of Camooweal, Jul 1958, *Trapnell 23* (BRI); *c.* 90 km S of Tennant Creek, Jul 1968, *Weber 1075* (BRI); Stuart Highway, 11 km NW of Elliott, Apr 1983, *Wilson 4717* (BRI). **Queensland.** Burke District: red sand hills NE of Barkly Downs Homestead, *c.* 104 km WNW of Mt Isa, Jul 2000, *Bailey & Kelman s.n.* (BRI [AQ778392]); Barkly Downs, *c.* 104 km WNW to NW of Mt Isa, May 2001, *Bailey & Kelman s.n.* (BRI [AQ778393]); SW corner of Pilpah Range, 12.5 km NNE of Barkly Downs homestead, Nov 2004, *Kelman DTK101104_8* (BRI).

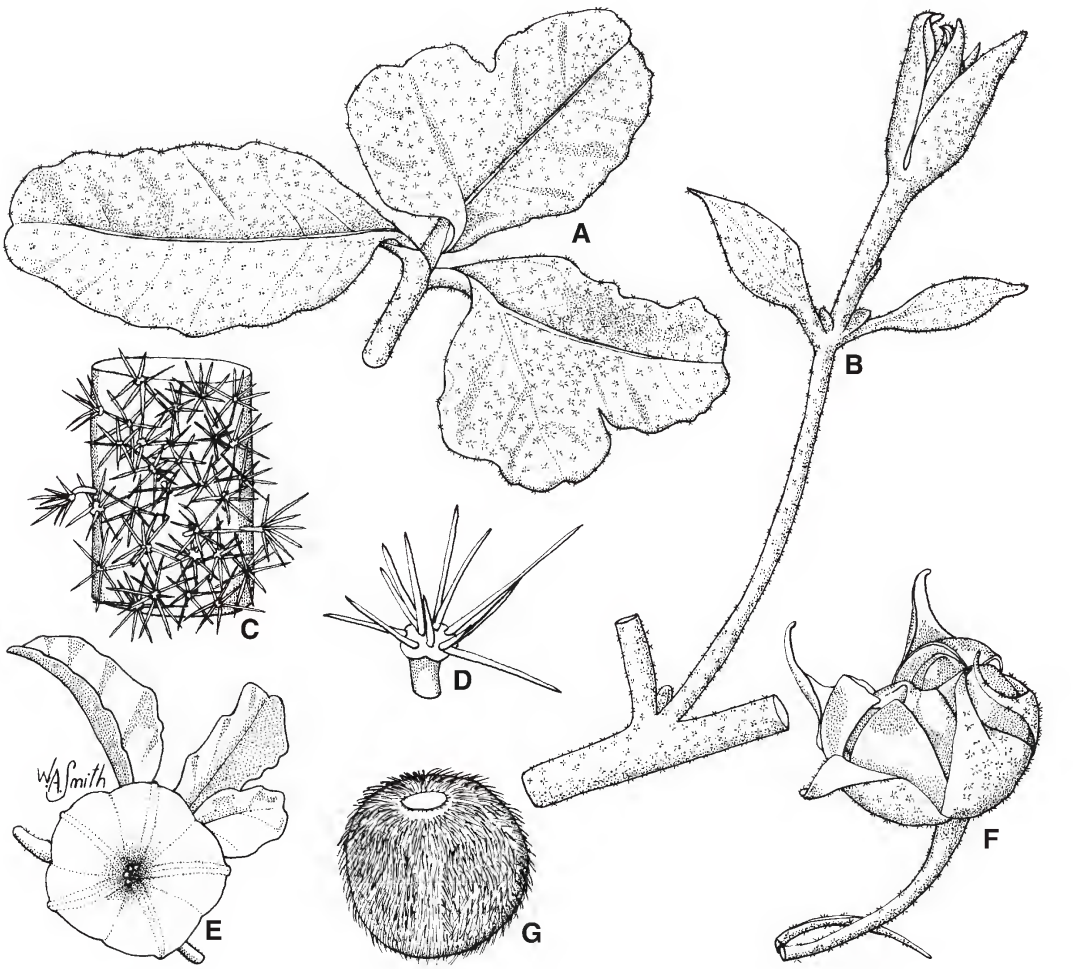

Fig. 2. ***Davenportia davenportii***. A. leaf × 2. B. young inflorescence showing bracteoles × 1.5. C. enlarged stem showing vestiture × 12. D. stalked multiangulate stellate hair × 50. E. flower × 1. F. fruit × 1.5. G. seed × 4. A,C,D from *Kelman DTK101104_8* (BRI); B from *Everist 4262* (BRI); E based on plate by Moore (2005: 413) and descriptions; F from *Bailey & Kelman s.n.* (BRI [AQ778393]); G from *Bailey & Kelman s.n.* (BRI [AQ778392]). Del. W.Smith.

Distribution and ecology: *Davenportia davenportii* occurs in coastal areas of north-western Western Australia, through the southern Northern Territory, extending into north-western Queensland. It grows on red to brown sandy soils in woodlands and shrublands, often adjoining creeks (**Map 1**).

Phenology: It flowers and fruits throughout the year, depending on moisture availability.

Conservation status: The species is not regarded as threatened in either the Northern Territory or Western Australia. It is known from only one population in Queensland.

Acknowledgements

I appreciate the continuing support provided by Dr Gordon Guymer, Director of BRI, which enables me to continue my taxonomic research. I thank Will Smith (BRI) for the illustrations, Dr Mary Dettmann for advice on palynology, Hans Dillewaard for S.E.M. imaging and Les Pedley for his comments on the manuscript. I thank Dr Dick Brummitt for providing me with details of the stellate hairs of *Merremia stellata*.

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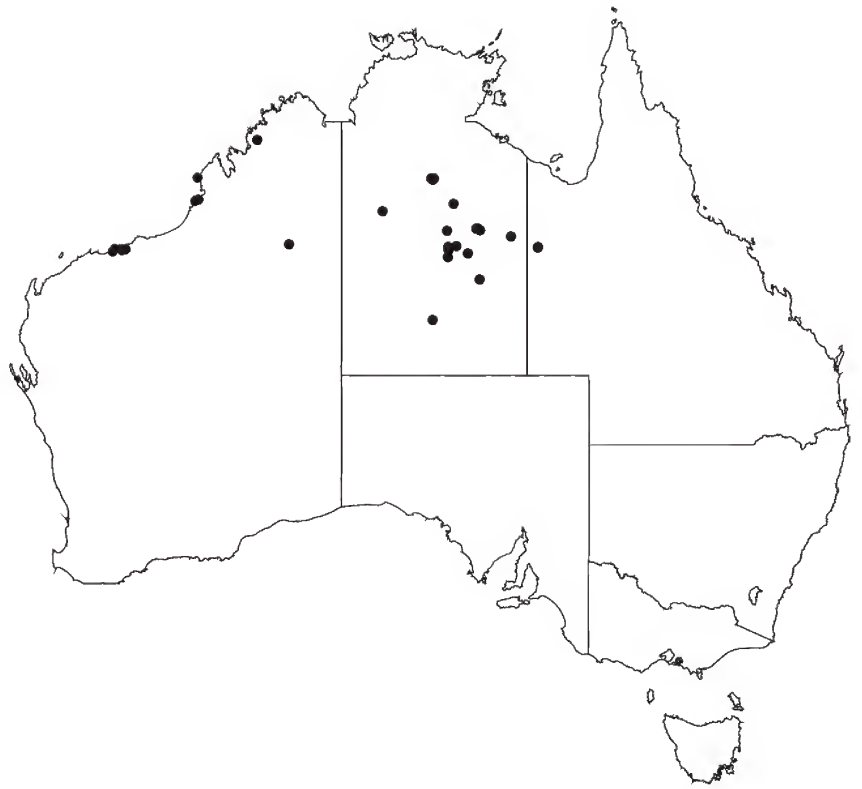

Map 1. Distribution of ***Davenportia davenportii***

Miscellaneous taxonomic and nomenclatural notes for Myrtaceae

Neil Snow[1] & J.F.Veldkamp[2]

Summary

Snow, N. & Veldkamp, J.F. (2010). Miscellaneous taxonomic and nomenclatural notes for Myrtaceae. ***Austrobaileya* 8(2): 177–186.** Typifications are provided for *Psidium cattleianum* Sabine and *P. guineense* Sw. from Brazil and the Caribbean respectively. *Episyzygium oahuense* Suess. & A.Ludw. is confirmed as being a synonym of *Psidium cattlieanum*, not of *Eugenia*. Two varieties of *P. cattleianum* from Brazil are reduced to synonymy. New combinations are made in *Gossia*, *Syzygium* and *Xanthomyrtus* for a number of species from Malesia and Melanesia. For *Syzygium* these include *S. thompsonii* (Merr.) N.Snow (including *Eugenia trukensis* Hosokawa, syn. nov.) based on *E. thompsonii* Merr.; *S. bifarium* (Wall.) Veldk. based on *E. bifaria* Wall., which is neotypified; and *S. melastomatifolium* (Blume) Veldk., which is based on *Jambosa melastomatifolia* Blume. *Xanthomyrtus kanalaensis* (Hochr.) N.Snow comb. nov., based on *E. kanalaensis* Hochr., is the older and correct name for the endemic species on New Caledonia formerly known as *X. hienghenensis* Guillaumin. New combinations for Melanesian species of *Gossia* are provided, including *G. alaternoides* (Brongn. & Gris) N.Snow, *G. alaternoides* var. *conspicua* (Vieill. ex Guillaumin) N.Snow), *G. alaternoides* var. *pulchrifolius* (Guillaumin) N.Snow, *G. aphthosa* (Brongn. & Gris) N.Snow, *G. clusioides* (Brongn. & Gris) N.Snow, *G. colnettiana* (Guillaumin) N.Snow, *G. diversifolia* (Brongn. & Gris) N.Snow, *G. kuakuense* (Vieill. ex Guillaumin) N.Snow (an older name for a basionym for the species recently known in New Caledonia as *Austromyrtus cataractarum*), *G. nigripes* (Guillaumin) N.Snow, *G. pancheri* (Brongn. & Gris) N.Snow, *G. vieillardii* (Brongn. & Gris) N.Snow (which is shown to be the same taxon as the later named *G. aneityensis* (Guillaumin) N.Snow in Vanuatu), and *G. virotii* (Guillaumin) N.Snow. An expanded description based on fruiting material is provided for *Rhodomyrtus kaweaensis* N.Snow from Papua New Guinea. Taxonomic boundaries in the context of morphological and molecular variation are discussed for *Rhodomyrtus montana* Guymer and *R. misimana* N.Snow from New Guinea.

Key Words: Myrtaceae, *Gossia*, *Psidium*, *Rhodomyrtus*, *Syzygium*, *Xanthomyrtus*, *Gossia alaternoides*, *Gossia alaternoides* var. *conspicua*, *Gossia alaternoides* var. *pulchrifolius*, *Gossia aphthosa*, *Gossia clusioides*, *Gossia colnettiana*, *Gossia diversifolia*, *Gossia kuakuense*, *Gossia nigripes*, *Gossia pancheri*, *Gossia vieillardii*, *Gossia virotii*, *Psidium cattleianum*, *Psidium guineense*, *Rhodomyrtus kaweaensis*, *Rhodomyrtus misimana*, *Rhodomyrtus montana*, *Syzygium bifarium*, *Syzygium melastomatifolium*, *Syzygium thompsonii*, *Xanthomyrtus kanalaensis*, *Xanthomyrtus hienghenensis*, Brazil flora, Caribbean flora, Malesia flora, Melanesia flora, New Caledonia flora, New Guinea flora, taxonomy, nomenclature, new combinations

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Introduction

Recent curatorial work has uncovered several taxonomic situations in Myrtaceae that now can be clarified or addressed. A number of new combinations also now can be made available as a precursor to a longer treatment of *Gossia* N.Snow & Guymer for New Caledonia that will be forthcoming from the first author. We bring this information together here in a single paper given that an appropriate publication venue for its individual components might otherwise be delayed.

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1. Typification of *Psidium cattleianum* Sabine

Despite its widespread cultivation and abundance as a serious weedy tree in many parts of the world (Weber 2003; Tassin *et al.* 2006) and its inclusion in many recent Floras (e.g., Jie & Craven 2007; Landrum 2009), the type status of this taxon previously has not been

clarified. Designation of a type at the present time will obviate others from tracking down its history or await its publication at a later time. The new varieties proposed by Mattos (1981, 2007) appear to be of no taxonomic significance, representing slight variations in fruit shape (Mattos 1981) or colour (Mattos 2007: 5) of this widespread species.

Psidium cattleianum Sabine, *Trans. Hort. Soc. London* 4: 315, t. 11 (1821); Weinm. in Hornsch., *Syll. Pl. Nov.* 2: 166 (1825) ("*cattleyanum*"), *orth. var.*; *Guajava cattleiana* (Sabine) Kuntze, *Revis. Gen. Pl.* 1: 239 (1891) ("*cattleyana*"). **Type:** *Trans. Hort. Soc. London* 4: t. 11 (1821) (lecto: here designated [digital copy of plate viewed]).

Episyzygium oahuense Suess. & A.Ludw., *Mitt. Bot. Staatssamml. München* 1: 18 (1950). **Type:** Hawaii, Oahu, Waianae, February 1930, *A.K.Meebold 8545* (holo: M [viewed digitally], barcode M-0164198; *"8445"*).

Eugenia pseudovenosa H.Perrier, *Mem. L'Instit. Scient. de Madagascar, Sér. B, Tome IV, Fasc.* 2:180 (1952 [1953]), ***syn. nov.*** **Type:** Madagascar, Fianarantsoa: Vestiges de la forêt littorale au voisinage de l'embouchure de Fanantara, *H.Perrier 6516* (holo: P!).

Psidium cattleianum (as *cattleyanum*) Sabine var. *pyriformis* Mattos, *Loefgrênia* 76: 1 (1981; see also pp. 2–3 regarding errata), ***syn. nov.*** **Type:** Brazil, Rio Grande do Sul, Santa Maria, cult., 30 July 1977, *A.Fisher s.n.* (holo: IPNR *n.v.*).

Psidium cattleianum (as *cattleyanum*) Sabine var. *purpureum* Mattos, *Loefgrênia* 124: 4 (2007), ***syn. nov.*** **Type:** Brazil, Santa Catarina, cult. em Jurerê Internacional, Florianópolis, 5 May 2007, *J.Mattos 32737* (holo: FLOR *n.v.*; iso: HBR *n.v.*).

The spelling "*cattleianum*", not "*cattleyanum*", is the original and thus the correct orthography (Art. 60.1, Ex. 9–12.). *Guajava cattleyana* (Sabine) Kuntze (1891) and *Psidium cattleyanum* Weinm. (1828) are both included in IPNI (as "Weinw." for the latter) but are merely orthographic variants.

The protologue indicates the description was based on "a plant cultivated by Messrs. Barr & Brookes, of Ball's Pond, Newington, England, said to have come as seeds from China". Lindley, however, in 1824 corrected this to "a native of some parts of South America". Green (1994) and Jie & Craven (2007) have indicated that the species is native to Brazil.

The taxonomy and nomenclature of *Psidium cattleianum* has fluctuated significantly. For example, Wagner *et al.* (1999: 971) did not recognize infraspecific taxa for Hawaii. Britton & Wilson (1925) recognized *P. littorale* Raddi as a taxon distinct from *P. cattleianum*. Others have recognized *P. cattleianum* var. *littorale* (Raddi) Fosberg for populations with somewhat longer petioles and longer leaf blades, which also bear more yellowish fruits at maturity (e.g., Fosberg 1962; Green 1994; see also Burkill [1997], who indicated the species as having "a number of varieties, distinguished on fruit shape"). The lectotypification here applies specifically to red-fruited material. An illustration of the yellow-fruited taxon was provided in the protologue by Raddi, but we have not reviewed the details of its typification.

Merrill & Perry (1938) regarded *Psidium littorale* Raddi to predate Sabine, as they thought it had appeared in 1820. According to Stafleu & Cowan (1983), Raddi's paper was published in 1821 and reprinted in 1823. Raddi (1823) described the fruit as "verde-giallognola" (green yellowish; Dr. R.M.Baldini, FI, pers. comm.). The comments by Schroeder (1946), who argued that the epithet *cattleianum* predates that of *littorale*, have been followed by many (Jie & Craven 2007). As it cannot be shown with absolute certainty which of the two papers was first, Preamble 10 (McNeill *et al.* 2006) applies "In the absence of a relevant rule or where the consequences of rules are doubtful, established custom is followed" and *P. cattleianum* is accepted here.

Warren L. Wagner (in 1986, then at BISH) was the first to annotate the holotype of *Episyzgium oahuense* as a synonym of *P. cattleianum*, a decision with which we agree. Govaerts *et al.* (2008: 80, 162) incorrectly cited it as a synonym of *Eugenia reinwardtiana* (where it appears misspelled in both places as "*cahuense*"). Although

A.J.Scott first annotated the type specimen of *Eugenia pseudovenosa* in August of 1978 to be "Psidium sp,. near cattleianum Sabine", and this interpretation of synonymy was on Wikispecies (2010) by October 2010, this appears to be the first report in print of its synonymy (i.e., contra Govaerts et al. 2008: 159). The tearing of sepal lobes on the specimen at P is quite evident, and the leaf size, shape, and venation matches perfectly with our concept of the species. Additional synonymy of *P. cattelianum* can be found in Govaerts *et al.* (2008: 349).

2. The type of *Psidium guineense* Sw.

Recommendation 9A.4. (McNeill *et al.* 2006), states "When a single collection is cited in the protologue, but a particular institution housing this is not designated, it should be assumed that the specimen housed in the institution where the author is known to have worked is the holotype, unless there is evidence that further material of the same collection was used". We designate it here.

Psidium guineense Sw., *Prodr.* 77 (1788); *Guajava guineensis* (Sw.) Kuntze, *Revis. Gen. Pl.* 1: 239 (1891); *Myrtus guineensis* (Sw.) Kuntze, *Revis. Gen. Pl.* 3(3): 91 (1898); *Mosiera guineensis* (Sw.) Bisse, *Rev. Jard. Bot. Nac.* 6(3) 4 (1985). **Type:** "In Domingo culta", *Swartz s.n.* (holo: S [S-R.5302, viewed digitally]; http://www.nrm.se/en/menu/researchandcollections.54_en.html.

The holotype specimen has "Culta in Hispaniola" written on it, whereas the protologue indicates "*in Domingo culta*".

3. *Xanthomyrtus kanalaensis* (Hochr.) N.Snow is the correct name for *X. hienghenensis* Guillaumin

Snow *et al.* (2003: 84) incorrectly suggested that *Eugenia kanalaensis* Hochr. was a member of *Uromyrtus* Burret. In fact, *Eugenia kanalaensis* is an earlier legitimate name for the same taxon known for many years as *Xanthomyrtus hienghenensis* Guillaumin, and thus a new combination is required in *Xanthomyrtus*.

Before discussing this taxonomic situation further it is important to reiterate that Vieillard designated numbers to taxa (as he perceived them), not to individual collections of specimens (Tirel & Veillon 2002: 175–176). Thus one or more specimens bearing the number *2627* were not necessarily from a single gathering made at the same time (Art. 8.2; McNeill *et al.* 2006). The lectotype specimen designated below for *Xanthomyrtus kanalaensis* is housed at NY and is one of two duplicates that Hochreutiner (1910) explicitly cited (the other being at K) as the basis for *X. kanalaensis*. Scott (1979: 477) indicated the same number (*Vieillard 2627*) as the type specimen for *X. hienghenensis* var. *latifolia* Guillaumin, given that Guillaumin explicitly cited *Vieillard 2627* as a syntype for *X. hienghenensis* var. *latifolia*. However, Scott was incorrect to cite it as the holotype, given that syntypes were clearly indicated in the protologue. This error is correctable under Art. 9.8 (see below). Lectotypification does not retroactively make names superfluous (Art. 52.2; McNeill *et al.* 2006).

The specimen in NY cited by Hochreutiner (1910) confirms that it is conspecific with *Xanthomyrtus hienghenensis* Guillaumin. In reality there are two specimens of this number at NY. One is a part of herbarium NY (proper), whereas the other, which also is now housed at NY, was part of the herbarium of the former Columbia College of Pharmacy Herbarium, which was transferred to NY in 1945.

Xanthomyrtus kanalaensis (Hochr.) N.Snow **comb. nov.**; *Eugenia kanalaensis* Hochr., *Bull. New York Bot. Gard.* 6: 280 (1910); *Austromyrtus kanalaensis* (Hochr.) Burret, *Notizbl. Bot. Gart. Berlin-Dahlem* 15: 504 (1941). **Type:** New Caledonia, Montagnes du lac à Kanala, 1861–1867, *E.Vieillard 2627* (lecto: NY [barcode no. 00405167], designated here; duplicates of lecto: NY [barcodes no. 01163693 and probably also 01163693; the latter in the same hand as designated lectotype but indicating only "Montagnes à Kanala"], K *n.v.*, P *n.v.*).

Xanthomyrtus hienghenensis Guillaumin, *Bull. Soc. Bot. France* 81: 16 (1934); *X. hienghenensis* var. *hienghenensis*, Guillaumin, *loc. cit.* 17. **Type:** New Caledonia, Hiengène, *s.dat.*, *A.Le Rat s.n.* (lecto: P; duplicates of lecto: L, P [designated by Scott (1979: 477)]).

Xanthomyrtus hienghenensis Guillaumin var. *latifolia* Guillaumin, *Bull. Soc. Bot. France* 81: 17 (1934). **Type:** New Caledonia, Canala, *s.dat.*, *E.Vieillard 2627* (lecto: P, designated indirectly by Scott [1979: 477]; duplicates of lecto: K *n.v.*, NY).

Xanthomyrtus kanalaensis is the sole representative of the genus in New Caledonia (Scott 1979).

4. New combinations in Melanesian *Gossia*

A forthcoming treatment of *Gossia* in *Flore de la Nouvelle-Calédonie* will describe a number of new taxa. New combinations are provided here for species previously described in other genera, primarily *Myrtus* L. or *Austromyrtus* Burret.

Gossia alaternoides (Brongn. & Gris) N.Snow **comb. nov.**; *Myrtus alaternoides* Brongn. & Gris, *Bull. Soc. Bot. France* 12: 177 (1865); *Austromyrtus alaternoides* (Brongn. & Gris) Burret, *Notizbl. Bot. Gart. Berlin-Dahlem* 15: 504 (1941). **Type:** New Caledonia, Montages de Balade, 1855–1860, *E.Vieillard 495* (holo: P).

Gossia alaternoides (Brongn. & Gris) N.Snow var. **conspicua** (Vieill. ex Guillaumin) N.Snow **comb. et stat. nov.**; *Myrtus conspicua* Vieill. ex Guillaumin, *Bull. Soc. Bot. France* 85: 631 (1939 [1938]); ? *Austromyrtus conspicua* (Vieill. ex Guillaumin) Burret, *Notizbl. Bot. Gart. Berlin-Dahlem* 15: 505 (1941). **Type:** New Caledonia, montagnes de Ouatende, près Gatope, *s. dat.*, *E.Vieillard 2618* (holo: P; iso: BM, GH, P).

Gossia alaternoides (Brongn. & Gris) N.Snow var. **pulchrifolius** (Guillaumin) N.Snow **comb. et stat. nov.**; *Myrtus pulchrifolius* Guillaumin, *Mém. Mus. Nat. Hist. Nat., Paris, ser. B, Bot.* 8: 144 (1959), *Mém. Mus. Nat. Hist. Nat., Paris, ser. B, Bot.* 8: 289 (1962), (“*pulchrefolius*”). **Type:** New Caledonia, au dessus du campement Bernier (Montagne des Sources), 3 October 1951, *H.Hürlimann 3021* (lecto: P [here designated]; duplicates of lecto: A, NY, P, US, Z).

The correct spelling is *pulchrifolius* (not *pulchrefolius*) following Art. 60.8, Rec. 60G.1(a)(2); (McNeill *et al.* 2006). In 1959 Guillaumin cited *MacKee 3337*. Since Guillaumin in 1962 also cited his 1959 publication, the former is part of the protologue and therefore provided a syntype. The selection of *Hurlimann 3021* here is therefore a lectotypification.

Gossia aphthosa (Brongn. & Gris) N.Snow **comb. nov.**; *Eugenia aphthosa* Brongn. & Gris, *Bull. Soc. Bot. France* 13: 469 (1866); *Austromyrtus aphthosa* (Brongn. & Gris) Burret, *Notizbl. Bot. Gart. Berlin-Dahlem* 15: 504 (1941). **Type:** New Caledonia, colline de Wagap *s.dat.*, *E.Vieillard 2172* (holo: P; iso: A, B, GH, L [3 sheets]; MEL, P, Z).

Gossia clusioides (Brongn. & Gris) N.Snow **comb. nov.**; *Eugenia clusioides* Brongn. & Gris, *Bull. Soc. Bot. France* 12: 180 (1865); *Austromyrtus clusioides* (Brongn. & Gris) Burret, *Notizbl. Bot. Gart. Berlin-Dahlem* 15: 503 (1941). **Type:** New Caledonia *s.dat.*, *E.Deplanche 525* (holo: P).

This species has a number of distinctive intraspecific taxa that will be described at a later time (Snow, *ined.*).

Gossia colnettiana (Guillaumin) N.Snow **comb. nov.**; *Eugenia colnettiana* Guillaumin, *Mém. Mus. Nat. Paris, ser. B, Bot.* 8: 292 (1962). **Type:** New Caledonia, Mt. Colnett, 13 September 1951, *H.Hürlimann 1973* (holo: P; iso: Z).

Gossia diversifolia (Brongn. & Gris) N.Snow **comb. nov.**; *Eugenia diversifolia* Brongn. & Gris, *Bull. Soc. Bot. France* 12: 180 (1865); *Myrtus diversifolia* (Brongn. & Gris) Guillaumin, *Bull. Soc. Bot. France* 85: 631 (1939 [1938]). **Type:** New Caledonia, circa Balade, *s.dat.*, *E.Vieillard 476* (lecto: P *n.v.* [designated here]).

Myrtus flavida Schltr., *Bot. Jahrb. Syst.* 40, *Beibl.* 92: 30 (1908) (“*flavidus*”), ***syn. nov.*** **Type:** New Caledonia, near Magenta, *s.dat.*, *A.Le Rat 2003* (holo: P *n.v.*).

Type specimens for these names were not located during a visit to P by the first author in 2003. However, the description and numerous specimens leave little doubt to the association of the names with the cited types.

Gossia kuakuense (Baker f.) N.Snow **comb. nov.**; *Psidium kuakuense* Baker f., *J. Linn. Soc. Bot.* 45: 318 (1921). **Type:** New Caledonia, Kuakué (= Kouakoué), 13 May 1914, *R.Compton 930* (holo: BM).

Psidium floribundum Vieill. ex Guillaumin, *Ann. Mus. Col. Marseille, Ser. II.* 9: 150 (1911), *nomen*. **Vouchers:** New Caledonia, Wagap, *s.dat.*, *E.Vieillard 2171 bis* (P [presumably, *n.v.*]; BISH); *s.dat.*, *J.Pancher s.n., n.v.*

Eugenia cataractarum Guillaumin, *Bull. Soc. Bot. France* 85: 636 (1939 [1938]); *Austromyrtus cataractarum* (Guillaumin) Burret, *Notizbl. Bot. Gart. Berlin-Dahlem* 15: 503 (1941), ***syn. nov.*** **Type:** New Caledonia, bord du torrent, Wagap, *s.dat.*, *E.Vieillard 2171* (lecto: P [designated here]; duplicates of lecto: GH, P).

Psidium floribundum Vieill. ex Guillaumin was named without an accompanying description. The duplicate voucher at BISH is from Vieillard's herbarium and has "bis" written adjacent to the collection number at a later time in a different hand, which may be used to separate it from the lectotype for *Eugenia cataractarum*. Before distribution from Paris another label was affixed to the isotype with the name *E. cataractarum* (published in 1939).

Gossia nigripes (Guillaumin) N.Snow **comb. nov.**; *Myrtus nigripes* Guillaumin, *Bull. Soc. Bot. France* 85: 632 (1939 [1938]); ? *Austromyrtus nigripes* (Guillaumin) Burret, *Notizbl. Bot. Gart. Berlin-Dahlem* 15: 505 (1941). **Type:** New Caledonia, Montagnes situeés au sud de Canala, 20 November 1869, *B.Balansa 2085* (holo: P; iso: P).

Gossia pancheri (Brongn. & Gris) N.Snow **comb. nov.**; *Eugenia pancheri* Brongn. & Gris, *Bull. Soc. Bot. France* 12: 180 (1865); *Austromyrtus pancheri* (Brongn. & Gris) Burret, *Notizbl. Bot. Gart. Berlin-Dahlem* 15: 503 (1941). **Type:** New Caledonia, montagnes de Yaté, *s.dat.*, *E.Vieillard 508* (lecto: P [designated here]).

Myrtus luteoviridis Baker f., *J. Linn. Soc. Bot.* 45: 312 (1921) (as "*luteo-viridis*"). ? *Austromyrtus luteoviridis* (Baker f.) Burret, *Notizbl. Bot. Gart. Berlin-Dahlem* 15: 505 (1941), ***syn. nov.*** **Type:** New Caledonia, Ngoye Mts to NW, 23 May 1914, *R.Compton 1339* (holo: BM *n.v.* [photo at BISH]).

Eugenia angustibracteoloata Baker f., *Linn. Soc. Bot.* 45: 313 (1921), ***syn. nov.*** **Type:** New Caledonia, Presqu'île Bogota, 28 June 1914, *R.Compton 1002* (holo: BM *n.v.* [photo at BISH!]).

Gossia vieillardii (Brongn. & Gris) N.Snow **comb. nov.**; *Eugenia vieillardii* Brongn. & Gris, *Bull. Soc. Bot. France* 12: 180 (1865); *Austromyrtus vieillardii* (Brongn. & Gris) Burret, *Notizbl. Bot. Gart. Berlin-Dahlem* 15: 503 (1941). **Type:** New Caledonia, prope Balade, *s,.dat.*, *E.Vieillard 484* (holo: P [barcode P00463006]). The type was annotated by the first author in 2004 as a lectotype, but the label indicating "Arbre; montagnes de Balade" generally matches the description in the protologue, so it is better considered the holotype.

Myrtus prolixa Baker f., *J. Linn. Soc. Bot.* 45: 311 (1921); ? *Austromyrtus prolixa* (Baker f.) Burret, *Notizbl. Bot. Gart. Berlin-Dahlem* 15: 505 (1941), ***syn. nov.*** **Type:** New Caledonia, *s.dat.*, *R.Compton 393* (holo: BM *n.v.* [photo at BISH]).

Myrtus aneityensis Guillaumin, *J. Arnold Arbor.* 12: 254 (1931); ? *Austromyrtus aneityensis* (Guillaumin) Burret, *Notizbl. Bot. Gart. Berlin-Dahlem* 15: 506 (1941); *Gossia aneityensis* (Guillaumin) N.Snow, *Novon* 15: 478 (2005), ***syn. nov.*** **Type:** Vanuatu (= New Hebrides), Anelgauhat Bay, 23 February 1929, *S.J.Kajewski 810* (lecto: P [designated by Snow 2005]; duplicates of lecto: BRI, MEL).

Eugenia heckelii Pancher & Sebert [*Not. Bois. Nouv. Caléd.* 259 (1874)] may be a synonym of *G. vieillardii* but the first author has not seen a type.

The reduction to synonymy of *Gossia aneityensis* under *G. vieillardii* is significant biogeographically in that it appears to represent the only known species of *Gossia* from New Caledonia (including several other

undescribed species) that is not endemic to the island. *Gossia vieillardii* is the most common member of the genus in New Caledonia and has a bimodal distribution on the northern part of Grande Terre and on ultramafic substrates in the south. In Vanuatu it is common enough to have the vernacular name of "nivic" (Snow 2005). While some variation exists in relative levels of indumentum on the hypanthium, and the base of the mature fruit can vary from round to distinctly tapered, these differences have not been deemed consistent enough to merit recognition of more than one taxon.

Gossia virotii (Guillaumin) N.Snow **comb. nov.**; *Myrtus virotii* Guillaumin, *Mém. Mus. Nat. Hist. Nat., Paris, ser. B, Bot.* 4: 33 (1953). **Type:** New Caledonia, Vallée de la Rivière du Mt. Humboldt, environs de la Case Marc, ancient campement Pages, 13 November 1940, *R.Virot 411* (holo: P; iso: A, NOU, P).

5. New combinations in *Syzygium* Gaertn.

Syzygium thompsonii (Merr.) N.Snow **comb. nov.**; *Eugenia thompsonii* Merr., *Philipp. J. Sci.* 9, C: 121 (1914). **Type:** Guam. *Guam Experiment Station 469* (holo: PNH, lost; lecto: US, selected here [barcode *00118193*, viewed digitally; http://collections.nmnh.si.edu/emuwebbotweb/pages/nmnh/bot/Query.php. Since all PNH material from before WWII was destroyed when the Museum was bombed, selection of a lectotype to replace the holotype is desirable.

Eugenia trukensis Hosokawa, *J. Jap. Bot.* 13(4): 63 (1937), ***syn. nov.*** **Type:** Micronesia, Truk (= Chuuk), Wara Witipen-san, 15 August 1936, *T.Hosokawa 8434* (holo: TAI [illustration seen in Hosakawa 1937: 63]; iso: BISH [sheet no. *164906*], L [sheet no. *154985*, photograph *62/19*, barcode *0009475*, and 3 with just sheet numbers: *154817, 154709, 154716*; the first can be viewed digitally], TAI [viewed digitally]).

As presently understood, the native range of *Syzygium thompsonii* ranges from Chuuk State (geographical names following Motteler [2006]) in Micronesia to Guam and the Northern Mariana Island on Rota and Saipan. On Guam the species occurs in shaded forests over limestone (Stone 1970). Data from specimen labels suggest the elevation range is from near sea level to 450 metres (*c.* 1500 feet) on Rota. The species has rounded to cordate leaf bases, narrowly ovate leaf blades with somewhat sinuous margins, and prominent paniculate inflorescences that can be terminal, axillary, or cauliflorous. The fruits are red to dark red. Specimens from Guam tend to have more or less flattened branchlets with buds 11–13 mm long. In contrast, branchlets on specimens from Rota and Saipan tend be slightly 4-angled and have buds (6–)7–8.5 mm long. Further field studies and additional collections may confirm the need to create a new taxon for specimens from Rota and Saipan, perhaps at the infraspecific level. On Saipan the vernacular name is said to be "atoto" (Stone 1970), whereas the protologue indicates the vernacular name is "atian" for Chuuk.

Syzygium thompsonii is very similar to *S. stelechanthum* (Diels) Glassman, based on gross morphology of the leaf blade and inflorescence of the latter. The first author has seen a paratype (*Ledermann 13473*, BISH) and several specimens of *S. stelechanthum*, which appear to differ most notably from *S. thompsonii* by their longer leaves (up to 42 cm long, e.g. *Takamatsu 578*, BISH) and the presence of distinctly 4-angled or winged internodes. Interestingly, the 4-angled or winged aspect of the branches becomes more prominent in age, which is the reverse of most species in the Myrtaceae that have this trait, wherein (when present) the youngest branchlets tend to be 4-angled and become increasingly terete or flattened with age (e.g. Snow *et al.* 2003: 6). Moreover, the wings of *S. stelechanthum* become lignified with age, which also is atypical for Myrtaceae. When present in *S. stelechantum*, the wings are most prominent in younger internodes, are widest below the nodes, and are often flared apically.

The known distribution of *Syzygium stelechanthum* in Micronesia is Pohnpei (Pohnpei State [Motteler 2006]) and Kosrae (Kosrae State [Motteler 2006]). On Pohnpei it ranges from 30–610 m elevation and is known locally as "irekinwel" (*Amor 123*, BISH) or "kartenwiel" (*Glassman 2364*, BISH). On

Kosrae ("Kusaie" of many older specimens) it occurs in coastal lowland forests or the margins of wetlands to the summit of Mt Matanta at *c.* 630 metres, where it can be common in dense primary forests (*Fosberg 26592*, BISH). The specimens from Kosrae have the largest leaves on average and the most prominently 4-angled-winged branches (e.g. *Takamatsu 578*, *Stemmermann 2635*, *St. John 21450* [all at BISH]). A specimen at L (*Stone 5398*) from Ponape, summit of Mt Seletenreh, U Distr., 610 m alt., was identified by Stone himself. The young, terete branchlets are not at odds with our concept of *S. thompsonii*.

Syzygium melastomatifolium (Blume) Veldk. **comb. nov.**; *Jambosa melastomatifolia* Blume, *Mus. Bot.* 1: 102 (1859) (as "*melastomaefolium*"); *Arbor rubra secunda* Rumph., *Herb. Amboin.* 3: 76 (1743), *nom. inval.*; *Eugenia melastomatifolia* (Blume) Merr., *Bur. Sci. Publ.* 9: 398 (1917) (as "*melastomifolia*"). **Type:** Ambon, *Zippelius s.n.* (holo: L [presumably, but not found]). **Neotype:** *Robinson, Pl. Rumph. Herb. Amboin. 198* (US [here designated]; iso: A, BM, BO, F, K, L, MO, NSW, NY).

The epithet has been spelled as "*melastomaefolia, -um*", but the correct orthography is "*melastomat-i-folium*" (compare Melastomat-a-ceae), see Rec. 60G.1(a)(1); (McNeill *et al.* 2006).

Syzygium bifarium (Wall.) Veldk. **comb. nov.**; *Eugenia bifaria* Wall., *Pl. Asiat. Rar.* 2: 47, t. 161 (1831); *Jambosa bifaria* Miq., *Fl. Ind. Bat.* 1, 1: 422 (1855). **Type:** Himalaya, *Wallich Cat. 3605* (holo: K; IDC microfiche 7394).

Miquel (1855: 422) equated this with *Jambosa melastomatifolia* Blume (1849), but we agree with Merrill (1917) that two distinct species are involved here, one from the Himalaya, the other from Ambon.

6. An expanded description of *Rhodomyrtus kaweaensis* N.Snow

Rhodomyrtus kaweaensis N.Snow was first described based on a single gathering (Snow 2006). A second collection bearing fruit has been identified by the first author, which was distributed from LAE as *Timonius* sp. (Rubiaceae). Its discovery permits the following expanded description of this species.

Trees to 5 metres tall with few branches. Fruits globose, 8.5–11 mm long × 6.5–9 mm wide (dried), silvery green (incompletely mature), moderately to densely appressed sericeous-tomentose, base rounded; bracteoles mostly persistent in fruit; calyx lobes persisting or not. Embryos C-shaped, the distal end of the hypocotyl somewhat swollen; cotyledons narrow, thin, reflexed against the hypocotyl (similar to, but more C-shaped than Fig. 1c in Landrum & Stevenson [1986]).

***Additional specimen examined*: Papua New Guinea**. Morobe District: Mt Kawea, Buso, Apr 1972, *Streimann & Foreman NGF 24432* (BISH, L; other duplicates reportedly at A, BO, BRI, CANB, K, LAE, NSW, PNH, SING).

The species is now known from an elevation range of 600–800 metres on Mt Kawea. Label data from the specimen cited above reports the plant as being a few-branched tree. As with the type specimen (Snow 2006), the leaves of this specimen are restricted to the distal 10 cm or less of the branches, which gives the living crown of the species an open appearance. The habitat on the present specimen is said to be stunted lowland forest on an exposed ridge over ultrabasic rocks. Mt Kawea is a part of the Bowutu Terrain, whose rocks are of oceanic origin from approximately the middle Cretaceous to the Eocene, and which comprise in part the East Papua composite terrane (Pigram & Davies 1987). The Bowutu Terrain comprises part of the Papuan ultrabasic belt (Takeuchi 2003). Unlike New Caledonia, where ultrabasic rocks are abundant and their influence on vegetation has been well studied, less attention has been directed at the distribution of plants over ultrabasic substrates in New Guinea (Takeuchi 2003).

Although the embryos of the specimen appear to be fully developed (or nearly so), the seed coats, which in *Rhodomyrtus* are usually sclerotic (Snow *et al.* 2008), have not begun to harden and are barely recognizable as such. If this specimen is representative, then the hardening of the seed coats may occur relatively late during the ontogeny of the fruit. The embryos appear to be stacked vertically

in neat rows in the locules, which is typical for many but not all species of *Rhodomyrtus* (Snow *et al.* 2008, in press), although it is uncertain yet whether the fruits develop membranous partitions between the seeds. Thus, for the tabular summary of putatively important vegetative and reproductive characters of *Rhodomyrtus* provided by Snow *et al.* (2008: 692), the only additions that can be made for *R. kaweaensis* at the present time are that the seeds are stacked and that the embryos are C-shaped.

Fruiting is only confirmed for April, but it is likely that fruits can persist from early to mid-August through April or early May, given the flowering date on the type specimen in July (Snow 2006). (Note: Table 1 in Snow [2006] should read *Gossia longipetiolata* N.Snow, not *Rhodomyrtus longipetiolata*. Also, the icons for *Rhodomyrtus kaweaensis* and *R. mengenensis* N.Snow in Map 1 were reversed, and Figures 5 and 6 are images of an isotype of *R. mengenensis* at BISH, not of the holotype [Snow 2006]).

7. On the identities of *Rhodomyrtus montana* and *R. misimana* in New Guinea

Snow *et al.* (2008) described *Rhodomyus misimana* N.Snow and differentiated it from *R. montana* Guymer based on the much sparser indumentum on the abaxial laminar surface of the former, slight differences in adaxial laminar sheen (somewhat glossy in *R. montana*), the widely disjunct distributions of the species, and differences in elevation.

A collection from the east branch of the Avi Avi River near Lakekamu, Gulf Province, Papua New Guinea (*Takeuchi & Kulang 11,390* [NY]) on loan to the first author has an abaxial leaf surface indumentum intermediate in density between *R. misimana* and *R. montana*, which suggests the newer name may need to be merged under *R. montana* or reduced in rank. The Avi Avi collection is from *c.* 135 m along a low ridge in a Clusiaceae dominated foothill forest. As presently known, *R. montana* is known only from the Arfak and Netotti ranges in the Vogelkop Peninsula of Papua Province, Indonesia, whereas *R. misimana* is known only from the type collection on Misima Island of Papua New Guinea. The Lakekamu collection is *c.* 760 km northwest of Misima Island in the foothills on the western fall of the Owen Stanley Range, and *c.* 1550 km southeast of the Arfak Range. Additional collections are needed to better assess the taxonomic variation among these taxa and specimens. However, because at least 65 base pair differences exist (Snow *et al.* in press) between their aligned nuclear ribosomal ITS sequences (ITS-1,-2, and spacer), based on the single specimen sequenced for each species, no changes in the taxonomy of *R. misimana* and *R. montana* are proposed at the present time.

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New taxa, nomenclatural changes and notes on Australian grasses in the tribe *Paniceae* (Poaceae: *Panicoideae*)

Bryan K. Simon

Summary

Simon, B.K. (2010). New taxa, nomenclatural changes and notes on Australian grasses in the tribe *Paniceae* (Poaceae: *Panicoideae*). ***Austrobaileya* 8(2): 187–219**. *Arthragrostis brassiana* B.K.Simon, *Digitaria basaltica* B.K.Simon, *Digitaria cowiei* B.K.Simon, *Digitaria dolleryi* B.K.Simon, *Digitaria sharpeana* B.K.Simon, *Digitaria veldkampiana* B.K.Simon, *Entolasia minutifolia* B.K.Simon, *Isachne sharpii* B.K.Simon, *Paspalidium johnsonii* B.K.Simon and *Pseudoraphis jagonis* B.K.Simon are diagnosed as new species. *Pseudoraphis minuta* var. *laevis* B.K.Simon and *Arthragrostis brassiana* var. *minutiflora* B.K.Simon are diagnosed as new varieties. New combinations and changes of status are provided for *Cenchrus brevisetosus* (B.K.Simon) B.K.Simon, *Oplismenus mollis* (Domin) Clifford & Evans ex B.K.Simon, *Setaria pumila* subsp. *subtesselata* (Buse) B.K.Simon, *Urochloa occidentalis* (C.A.Gardner & C.E.Hubb.) B.K.Simon, *Urochloa occidentalis* var. *ciliata* (C.A.Gardner & C.E.Hubb.) B.K.Simon and *Urochloa gilesii* var. *nothochthona* (Domin) B.K.Simon. All *Pennisetum* species have recently been placed in synonymy with *Cenchrus* and the name changes that apply to taxa occurring in Australia are listed. *Cenchrus spinifex* Cav. is the correct name for what has been called *C. incertus* M.A.Curtis. Two more species of *Cyrtococcum*, *C. patens* (L.) A.Camus and *C. accrescens* (Trin.) Stapf are reported as occurring in Australia. Two species of *Digitaria* Hall., *D. diminuta* Hughes and *D. fumida* S.T.Blake, are removed from the synonymy of *D. breviglumis* (Domin) Henrard; the latter species has been recircumscribed to include a species previously known under the phrase name *Digitaria* sp. (Mt Mulligan J.R.Clarkson 5821). Keys and descriptions are given to the species *D. breviglumis*, *D. diminuta*, *D. fumida* and *D. orbata* Hughes. *Isachne minutula* (Gaudich.) Kunth is the correct name of a species previously referred to in Australia as *I. pulchella* auct. non Roth. The genus *Plagiosetum* Benth. is resurrected from synonymy with *Paractaenum* P.Beauv. *Brachiaria occidentalis var. ciliaris* C.A.Gardner & C.E.Hubb., *Oplismenus undulatifolius* var. *molle* Domin and *Pseudoraphis minuta* (Mez) Pilger are lectotypified.

Key Words: Poaceae, Paniceae, *Arthragrostis*, *Arthragrostis brassiana*, *Arthragrostis brassiana* var. *minutiflora*, *Cenchrus*, *Cenchrus brevisetosus*, *Cenchrus spinifex*, *Cyrtococcum*, *Cyrtococcum accrescens*, *Cyrtococcum patens*, *Digitaria*, *Digitaria basaltica*, *Digitaria breviglumis*, *Digitaria cowiei*, *Digitaria diminuta*, *Digitaria dolleryi*, *Digitaria fumida*, *Digitaria orbata*, *Digitaria sharpeana*, *Digitaria veldkampiana*, *Entolasia*, *Entolasia minutifolia*, *Isachne*, *Isachne minutula*, *Isachne sharpii*, *Oplismenus*, *Oplismenus mollis*, *Paspalidium*, *Paspalidium johnsonii*, *Plagiosetum*, *Pseudoraphis*, *Pseudoraphis jagonis*, *Pseudoraphis minuta*, *Urochloa*, *Urochloa occidentalis*, *Urochloa occidentalis* var. *ciliaris*, *Urochloa gilesii*, *Urochloa gilesii* var. *nothochthona*, Australia flora, Northern Territory flora, Queensland flora, Western Australia flora, taxonomy, nomenclature, new species, new variety, identification keys

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Introduction

The grass tribe *Paniceae* R.Br. in Australia has been studied by several authors for the past 25 years, in preparation for an account for the *Flora of Australia* (*FOA*). The first publication of the tribe from this project was prepared in a relatively short period of time from a DELTA database (Dallwitz 1980; Webster 1987). This work was enhanced to some degree for the *FOA* by Caroline Weiller (R.S.B.S, Australian National University) but the editors were of the opinion at the time that this treatment required further enhancement before publication. I have been revising the accounts submitted by Webster and Weiller in the intervening time by a constant modification of their DELTA character sets; this has resulted in the necessity to describe a number of new taxa, make some new combinations and re-examine the circumscription of some taxa.

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Materials and methods

The data and descriptions presented in this paper are based mainly on specimens from BRI, although many of these are duplicated in other Australian and overseas herbaria as indicated in the text. In cases where specimens are based on loaned material from other herbaria this is indicated and where these are types there is a photo in BRI. The data for the distribution maps has been extracted from the Queensland Herbarium database HERBRECS and only represents BRI material.

Common abbreviations in the specimen citations are N.P. (National Park) and S.F. (State Forest).

Taxonomy

1. New taxa of *Arthragrostis* Lazarides

The genus *Arthragrostis* Lazarides, characterised by spikelets with disarticulations at the base of the spikelets, secondary branches and primary branches, was originally described on the basis of one species (Lazarides 1985). Since then two more species were described (Simon 1986, 1992) and the presence of a fourth species, with two varieties, became apparent when herbarium specimens identified as *A. deschampsioides* (Domin) Lazarides were examined in greater detail.

Arthragrostis brassiana B.K.Simon, **species nova** *A. deschampsioidi* (Domin) Lazarides similis sed glumis circa aequilongis differt. **Typus:** Queensland. Cook District: Crest of Western Scarp of Great Dividing Range, 12 miles [19 km] E of The Lynd, 11 July 1954, *S.T.Blake 19478* (holo: BRI; iso: AD, CANB, DNA, K, L, MO, PERTH, PRE).

Flowering culms 30–70 cm tall, 3–5-noded. Ligule 0.5–0.7 mm long. Leaf blades flat, 3–9 cm long, 2–4 mm wide. Inflorescence 8–35 cm long. Primary branches 3–10 cm long. Pedicels distinctly angled. Spikelets 5–10 on a typical lowermost primary branch, lanceolate to ovate, 2–5.2 mm long, 0.6–1.5 mm wide. Glumes ± equal in length, glabrous; lower glume ovate to lanceolate, 3–5-nerved; upper glume lanceolate, 5–7-nerved, acute, muticous. Lower floret sterile; lemma with apex acute; palea vestigial. Upper floret: lemma yellow or brown, apically rounded, muticous; palea cartilaginous.

***Notes*:** This species differs from *A. deschampsioides* by the glumes being more or less equal in length as opposed to being distinctly unequal. The known distributions of both species are presented in **Map 1**.

Two varieties are here recognised and distinguished by spikelet size, 3.8–5.2 mm long in var. *brassiana* and 2–3.5 mm long in var. *minutiflora.* The varieties appear to be at least partially sympatric based on the available collection records.

***Etymology*:** Named for Leonard J. Brass (1900–1971), Australian botanist who collected widely in north Queensland, New Guinea and tropical Africa and who collected most of the material of the species and the type specimen of the new variety.

Arthragrostis brassiana var. **brassiana**

Inflorescence 16–30 cm long. Spikelets 3.8–5.2 mm long, 1–1.5 mm wide. Lower glume 3–3.2 mm long, lanceolate, 5-nerved. Upper glume 3.4–3.7 mm long, lanceolate, 7-nerved. Lower floret; lemma 3.8–5.2 mm long, chartaceous; palea vestigial (*c.* 0.5 mm long), with a rounded apex. Upper floret: lemma 1.5–2 mm long, decidedly firmer than glumes, coriaceous, smooth, oblong.

***Additional specimens examined*: Queensland**. Cook District: Newcastle Bay, 2.5 miles [4 km] S of Somerset, May 1948, *Brass 18712* (A, BRI); Lockerbie, 10 miles [16 km] W of Somerset, Apr 1948, *Brass 18495* (A, BRI); Jardine River, May 1948, *Brass 18875* (A, BRI); Shipton's Flat, Sep 1948, *Brass 20166* (A, BRI). Burke District: Esmeralda Station, Richmond – Croydon Road, Mar 2003, *Kahler TH7828 & Appelman* (BRI).

***Distribution and habitat*:** Northern Queensland, mainly on Cape York peninsula with one record from the Burke District (**Map 1**). It occurs in coastal sand dunes and open woodland.

***Phenology*:** Flowering May, July, September.

Arthragrostis brassiana var. **minutiflora** B.K.Simon, **varietas nova** *A. brassiana* var. *brassiana* sed spiculis minoribus differt. **Typus:** Queensland. Cook District:

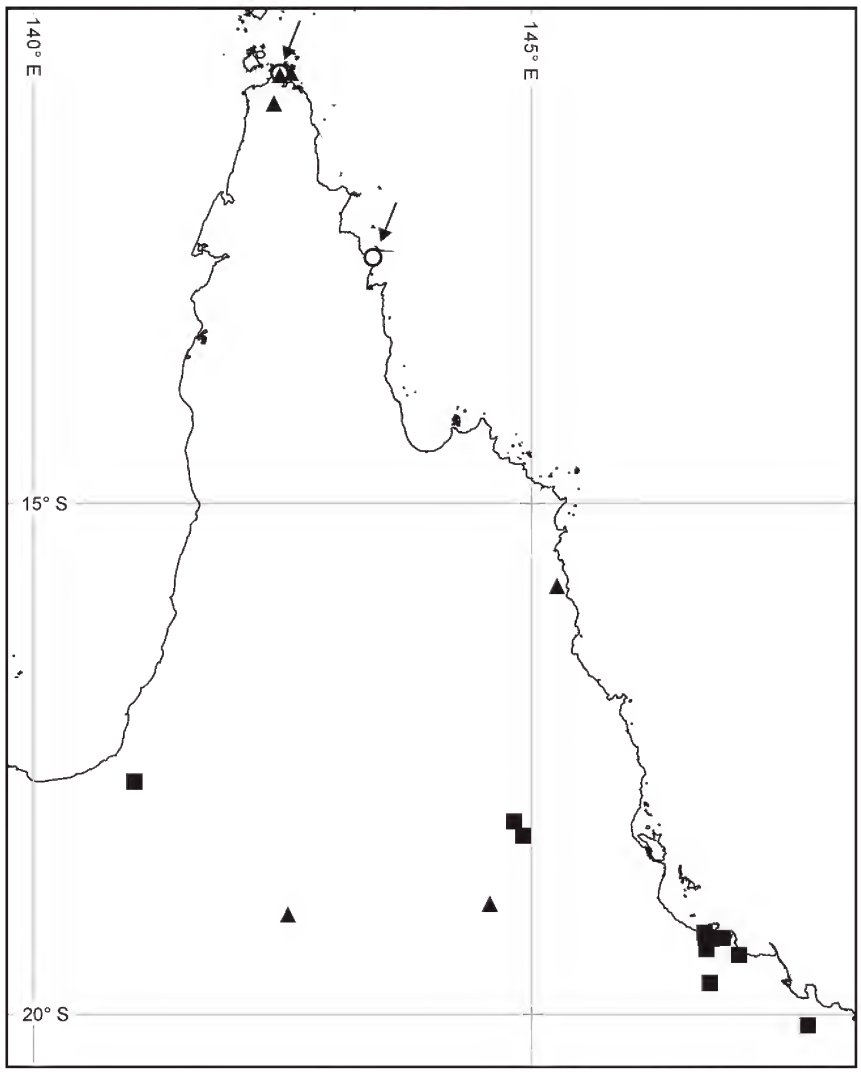
Lockerbie, 10 miles [16 km] W of Somerset, 4 May 1948, *L.J.Brass 18637* (holo: BRI; iso: A).

Inflorescence 20–35 cm long. Spikelets 2–3 mm long, 0.6–0.8 mm wide. Lower glume 2.1–2.4 mm long, lanceolate, 3-nerved. Upper glume *c.* 2 mm long, lanceolate, 5-nerved. Lower floret; lemma *c.* 2 mm long. Palea vestigial (*c.* 0.3 mm long). Upper floret: lemma 1.3–1.4 mm long, decidedly firmer than glumes, coriaceous, smooth, oblong.

***Additional specimens examined*: Queensland.** Cook District: Portland Roads, Jun 1942, *Brass 19007* (A, BRI); Lockerbie, 10 miles [16 km] W of Somerset, Apr 1948, *Brass 18430* (A, BRI).

***Distribution and habitat*:** This variety is restricted to northern Cape York peninsula in open forest and rainforest margins (**Map 1**).

***Phenology*:** Flowering April to June.



Map 1. Distribution in northern Queensland of *Arthragrostis deschampsioides* ■, *A. brassiana* var. *brassiana* ▲ and *A. brassiana* var. *minutiflora* ○

Key to species and varieties of *Arthragrostis* in Australia

1 Upper glume and lower lemma drawn out to an arista 2 mm or more long . . . . . **A. aristispicula**
1. Upper glume and lower lemma acute, acuminate or with an apical cusp to 0.3 mm long 2

2 Glumes with tubercle-based cilia . . . . . **A. clarksoniana**
2. Glumes glabrous 3

3 Glumes distinctly unequal . . . . . **A. deschampsioides**
3. Glumes ± equal 4

4 Spikelets 3.8–5.2 mm long . . . . . **A. brassiana** var. **brassiana**
4. Spikelets 2–3.5 mm long . . . . . **A. brassiana** var. **minutiflora**

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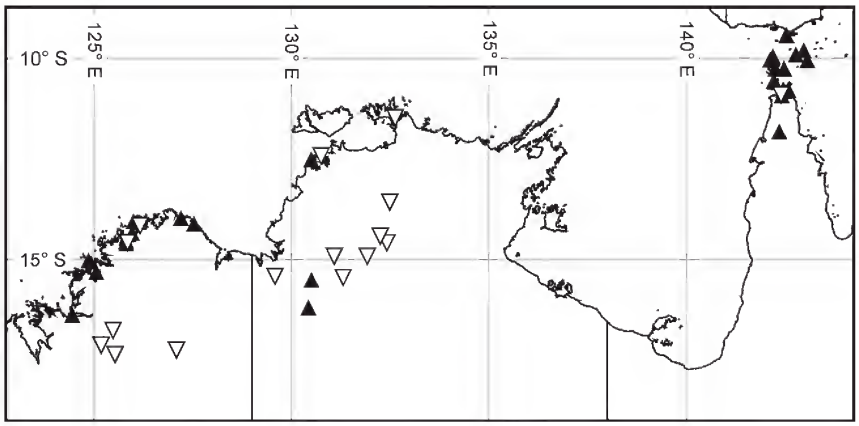
2. *Cenchrus* L. in Australia

The phylogeny of the bristle clade of the panicoid grasses has been researched for about ten years by a number of authors, leading to the amalgamation of the genera *Cenchrus* L. and *Pennisetum* Rich. (Chemisquy *et al.* 2010). This is relevant for all Australian taxa formerly placed in *Pennisetum*, although some other species had prior names under *Cenchrus*. This included the buffel grasses that had only recently been transferred to *Pennisetum* based solely on morphological spikelet characters (Wipff 2001).

The name changes of Chemisquy *et al.* (2010) that apply to Australia, along with others not mentioned by them, are summarised in **Table 1**. Details of basionyms and types for these name changes can be obtained from their paper.



Map 2. Distribution in northern Australia of *Cenchrus elymoides* ▽ and *C. brevisetosus* ▲

Table 1. Name transfers for *Cenchrus* taxa occurring in Australia

Previous Name	Currently Accepted Name
Pennisetum advena Wipff & Veldkamp, *Sida* 18(4): 1033, f. 1 (1999).	*Cenchrus advena* (Wipff & Veldkamp) Morrone, *Ann. Bot.* 106: 127 (2010).
Pennisetum alopecuroides (L.) Spreng., *Syst. Veg.* 1: 303 (1824).	*Cenchrus purpurascens* Thunb., *Trans. Linn. Soc. London* 2: 329 (1794).
Pennisetum basedowii Summerh. & C.E.Hubb., *Bull. Misc. Inform. Kew* 1926: 440 (1926).	*Cenchrus basedowii* (Summerh. & C.E.Hubb.) Morrone, *Ann. Bot.* 106: 127 (2010).
Pennisetum ciliare (L.) Link, *Hort. Berol.* 1: 213 (1827).	*Cenchrus ciliaris* L., *Mant. Pl.* 302 (1771).
Pennisetum clandestinum Hochst. ex Chiov., *Annuario Reale Ist. Bot. Roma* 8: 41 (1903).	*Cenchrus clandestinus* (Hochst. ex Chiov.) Morrone, *Ann. Bot.* 106: 127 (2010).
Pennisetum elymoides (F.Muell.) C.A.Gardner, *Fl. W. Australia* 277 (1952).	*Cenchrus elymoides* F.Muell., *Fragm.* 8: 107 (1873).
Pennisetum glaucum (L.) R.Br., *Prodr.* 195 (1810).	*Cenchrus americanus* (L.) Morrone, *Ann. Bot.* 106: 127 (2010).
Pennisetum macrourum Trin., *Gram. Panic.* 64 (1826).	*Cenchrus macrourus* (Trin.) Morrone, *Ann. Bot.* 106: 128 (2010).
Pennisetum pedicellatum Trin., *Mém. Acad. Imp. Sci. St. Pétersbourg Hist. VI, Sci. Math.* 3: 184 (1834).	*Cenchrus pedicellatus* (Trin.) Morrone, *Ann. Bot.* 106: 128 (2010).
Pennisetum pedicellatum subsp. *unispiculum* Brunken, *J. Linn. Soc., Bot.* 79: 62 (1979).	*Cenchrus pedicellatus* subsp. *unispiculus* (Brunken) Morrone, *Ann. Bot.* 106: 128 (2010).
Pennisetum pennisetiforme (Hochst. ex Steud.) Wipff, *Sida* 19: 527 (2001).	*Cenchrus pennisetiformis* Hochst. ex Steud., *Syn. Pl. Glumac.* 1: 109 (1854).
Pennisetum polystachion (L.) Schultes, *Mant.* 2: 146 (1824).	*Cenchrus polystachios* (L.) Morrone, *Ann. Bot.* 106: 129 (2010).
Pennisetum purpureum Schumach., *Beskr. Guin. Pl.* 44 (1827).	*Cenchrus purpureus* (Schumach.) Morrone, *Ann. Bot.* 106: 129 (2010).
Pennisetum setaceum (Forssk.) Chiov., *Bull. Soc. Bot. Ital.* 1923: 113 (1923).	*Cenchrus setaceus* (Forssk.) Morrone, *Ann. Bot.* 106: 129 (2010).
Pennisetum setigerum (Vahl) Wipff, *Sida* 19 (3): 527-527 (2001).	*Cenchrus setigerus* Vahl, *Enum. Pl.* 2: 395 (1805).
Pennisetum thunbergii Kunth, *Révis. Gramin.* 1: 50 (1829).	*Cenchrus thunbergii* (Kunth) Morrone, *Ann. Bot.* 106: 129 (2010).
Pennisetum villosum R.Br. ex Fresen., *Mus. Senckenberg.* 2: 134 (1837).	*Cenchrus longisetus* M.C.Johnst., *Sida* 1(3): 182 (1963).

One Australian taxon not included in the above table is *Cenchrus elymoides* var. *brevisetosus* B.K.Simon. This taxon is elevated to species rank as there appears to be a correlation to some degree, when looking at the two infra-specific taxa of *Cenchrus elymoides,* between geographical distribution and the morphological characters of the spikelets.

Cenchrus brevisetosus (B.K.Simon) B.K.Simon **stat. nov.**; *Cenchrus elymoides* var. *brevisetosus* B.K.Simon, *Austrobaileya* 2: 21 (1984). **Type:** Queensland. Cook District: Cape York, *s.dat.*, *E.Daemel s.n.* (holo: MEL [photo BRI]).

***Notes*:** *Cenchrus brevisetosus* differs from *C. elymoides* in that the outer involucral bristles are very short, with one involucral bristle extended apically beyond the burr. In *C. elymoides* the involucral bristles are as long as, or extend beyond the spikelets, with one involucral spine at least three times longer than others. *C. brevisetosus* and *C. elymoides* differ to some degree in their geographical distribution. BRI material shows that in Queensland the former species is only represented in the Torres Strait, whereas there are only two Queensland records in BRI of *C. elymoides* – both from Castle Hill, Townsville. This locality is so remote from the others in the Northern Territory and Western Australia that it is difficult to rationalise, but the odd distribution may be due to under collecting in the intervening zone. Both species are present in the Northern Territory and Western Australia with a tendency for *C. brevisetus* to be closer to the coast and *C. elymoides* more inland, but there are exceptions (**Map 2**).

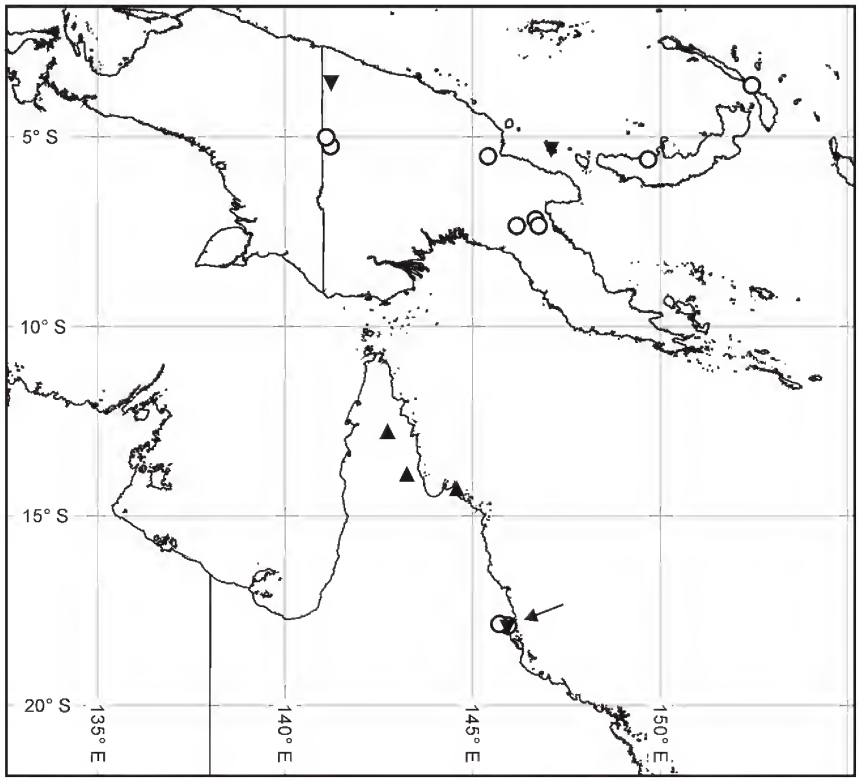
Cenchrus spinifex Cav.

Cenchrus spinifex Cav. [*Icon.* 5: 38, t. 461 (1799)] is the correct name for what has been called *C. incertus* M.A.Curtis [*Boston J. Nat. Hist.* 1: 135 (1837)]. There has been a hesitancy to use the name of Cavanilles before now because of the uncertainty of the type material. When DeLilse (1963) undertook his revision of the genus he only saw a reputed isotype of *C. spinifex* from the Chicago Natural History Museum, but was not certain of the correctness of the isotype label at that time. The holotype specimen is now available for examination at the MA website; a careful scrutiny reveals it to be the type collected by Née and that it is an earlier nomenclatural synonym of *C. incertus.* This synonymy has already been used in recent literature (Stieber & Wipff 2003).

3. *Cyrtococcum* Stapf in Australia

Until 1992 the only species of *Cyrtococcum* reported as occurring in Australia was *C. oxyphyllum* (Steudel) Stapf, but in that year an endemic species, *C. capitis-york* B.K.Simon (**Map 3**), was described from north Queensland (Simon 1992). This species has been regarded by some authors (Veldkamp, *Flora Malesiana* ms) as synonymous with *C. patens* (L.) A.Camus. If this name is used for the Cape York Peninsula material then the name should also apply to the Indian species *C. deccanense* Bor, with which *C. capitis-york* was compared when originally described. The tubercle-based hairs, smaller and tighter inflorescence and narrower leaf blades are all morphological characters that separate *C. capitis-york* from *C. patens*; the latter species is quite widespread in New Guinea (**Map 3**). To complicate matters an authentic Australian specimen of *C. patens* has been collected from near Tully (*Jago 5159 & Wannan* (BRI)) in 1999 (**Map 3**). Although not having as large an inflorescence as Asian material of this species, the specimen appears closer to *C. patens* than it does to *C. capitis-york.*

A fourth Australian species of *Cyrtococcum* collected in the last eight years is *C. accrescens* (Trin.) Stapf. It differs from *C. patens* by having smaller spikelets (1.35–1.5 mm compared to 1.5–1.8 mm) and a large more effuse panicle (20–50 × 6–30 cm compared to 3–18 × 0.8–3 cm). The two specimens in BRI both come from rainforest habitats of the Tully Region, north Queensland (*Gray 8117* from Bulbin Creek, 29 Apr 2002 (BRI, CNS) and *Ford AF5378 & Jones* from Tully River Island, 3 Sep 2008 (BRI, NSW)). Outside Australia its geographic range extends in Asia as far as southern China and to tropical regions in the Pacific (**Map 3**).



Map 3. Distribution in Australia and New Guinea of *Cyrtococcum capitis-york* ▲, *C. accrescens* ▼ and *C. patens* ○

Key to species of *Cyrtococcum* in Australia

1 Spikelets usually 1.35–1.5 mm long. Panicle usually effuse and open, 20–50 × 6–30 cm . . . . . **C. accrescens**
1. Spikelets longer than 1.5 mm long. Panicle open to contracted, 3–18 × 0.8–3 cm 2

2 Spikelets with tubercle-based hairs . . . . . **C. capitis-york**
2. Spikelets glabrous 3

3 Inflorescence contracted; upper glume as long as the spikelet, 3-nerved . . . . . **C. oxyphyllum**
3. Inflorescence open; upper glume shorter than the spikelet, 5-nerved . . . . . **C. patens**

4. New species and reinstatements of species in *Digitaria* Hall.

Further study of this genus subsequent to Webster (1983) has revealed five new species based upon examination of herbarium material.

Digitaria basaltica B.K.Simon, **species nova** *D. benthamianae* Henrard similis sed spiculis hirsutioribus, gluma inferiore longiore et lemmate inferiore 7-nervi differt. **Typus:** Queensland: North Kennedy District: Great Basalt Wall, 5 April 1995, *R.J.Fensham 2183* (holo: BRI; iso: CANB, K).

Digitaria sp. (Great Basalt Wall R.J.Fensham 2183) (*ined.*)

Perennial, rhizomatous. Flowering culms caespitose, 70–90 cm tall, 3–5-noded. Leaves: sheaths hairy; ligule 1.9–2.3 mm long; blades flat, 9–30 cm long, 3–5 mm wide, velvety hairy, scabrous. Inflorescence 15–40 cm long, on a distinct central axis. Racemes 14–17, usually devoid of spikelets at base, long and rigid, 17–37 cm long; central axis 10–14 cm long. Pedicels 1–4 mm long, apices cupuliform. Spikelets 24–36 on a typical lowermost primary branch, discernibly hairy, paired, lanceolate, 2.2–2.4 mm long, 0.9–1.2 mm wide; lower glume 0.8–0.9 mm long, oblong and truncate, nerveless, membranous, smooth, glabrous; upper glume 2.1–2.3 mm long, slightly shorter than spikelet, elliptic, 7-nerved, with ciliate margins and sub-margins, hairy, evenly villous, acute. Lower floret: lemma 2.2–2.4 mm long, hairy, 7-nerved; palea absent. Upper floret shorter than the lower floret; lemma 1.9–2 mm long, brown, cartilaginous, muricate, elliptic, acuminate, muticous; palea as long as and enclosed by lemma. **Fig. 1.**

***Distribution and habitat*:** This species is recorded from ephemeral wetlands on basalt from the Great Basalt Wall, Queensland (**Map 4**), where it was reported as locally dominant.

***Phenology*:** Flowering April.

***Notes*:** This species is a member of *Digitaria* section *Pennatae* (Stapf) Henrard (Webster 1983), together with *D. ammophila* (Benth.) D.K.Hughes, *D. papposa* (R.Br.) Beauv., *D. hystrichoides* Vickery, *D. benthamiana* Henrard, *D. nematostachya* (F.M.Bailey) Henrard, *D. porrecta* S.T.Blake, *D. divaricatissima* (R.Br.) D.K.Hughes and *D. coenicola* (Muell.) D.K.Hughes. It is so far known only from the type locality. It differs from *D. benthamiana* by the spikelets being discernibly hairy, the lower glumes being longer and by the lower lemma being 7-nerved, as opposed to 5-nerved in *D. benthamiana*.

***Etymology*:** Named for the geology of the habitat in which it grows.

Digitaria cowiei B.K.Simon, **species nova** *D. velutinae* (Forssk.) P.Beauv. similis sed glumis superioribus 5-nervis versus 3-nervis differt. **Typus:** Northern Territory. Darwin & Gulf: Amungee Mungee Station, 2 May 1991, *I.D.Cowie 1752 & B.A.Wilson* (holo: BRI; iso: DNA).

Digitaria sp. (Amungee Mungee Stn I.D.Cowie+ 1752) (*ined.*)

Annual. Flowering culms caespitose, 30–45 cm tall, 1 or 2-noded. Leaves: sheaths hairy; ligule 0.8–1.2 mm long; blades flat, 2–8 cm long, 1–3 mm wide, hairy, scabrous. Inflorescence 7–12 cm long, on a distinct central axis. Racemes 4–6, usually bearing spikelets to base, not long and rigid, 2.5–4.5 cm long. Pedicels 0.2–1.2 mm long, apices cupuliform. Spikelets 20–24 on a typical lowermost primary branch, hairy, paired, elliptic, 1.6–1.7 mm long, 0.7–0.8 mm wide. Lower glume 0.1–0.2 mm long. Upper glume 1.3–1.4 mm long, noticeably shorter than spikelet, oblong, 5-nerved, hairy, setose, rounded. Lower floret: lemma 1.6–1.7 mm long, hairy, with indumentum shorter than the spikelet, 7-nerved; palea absent. Upper floret subequal to the lower floret; lemma *c.* 1.6 mm long, brown, cartilaginous, muricate, lanceolate, acuminate, muticous; palea as long as and enclosed by lemma. **Fig. 1.**

***Additional specimen examined*: Northern Territory**. Darwin & Gulf: Escarpment behind Redbank Mine accommodation, May 1984, *Halford 845122* (BRI, DNA).

***Distribution and habitat*:** Only known from the Top End of the Northern Territory (**Map 4**) in *Acacia shirleyi – Macropteranthes kekwickii* thicket on shallow sandy soils.

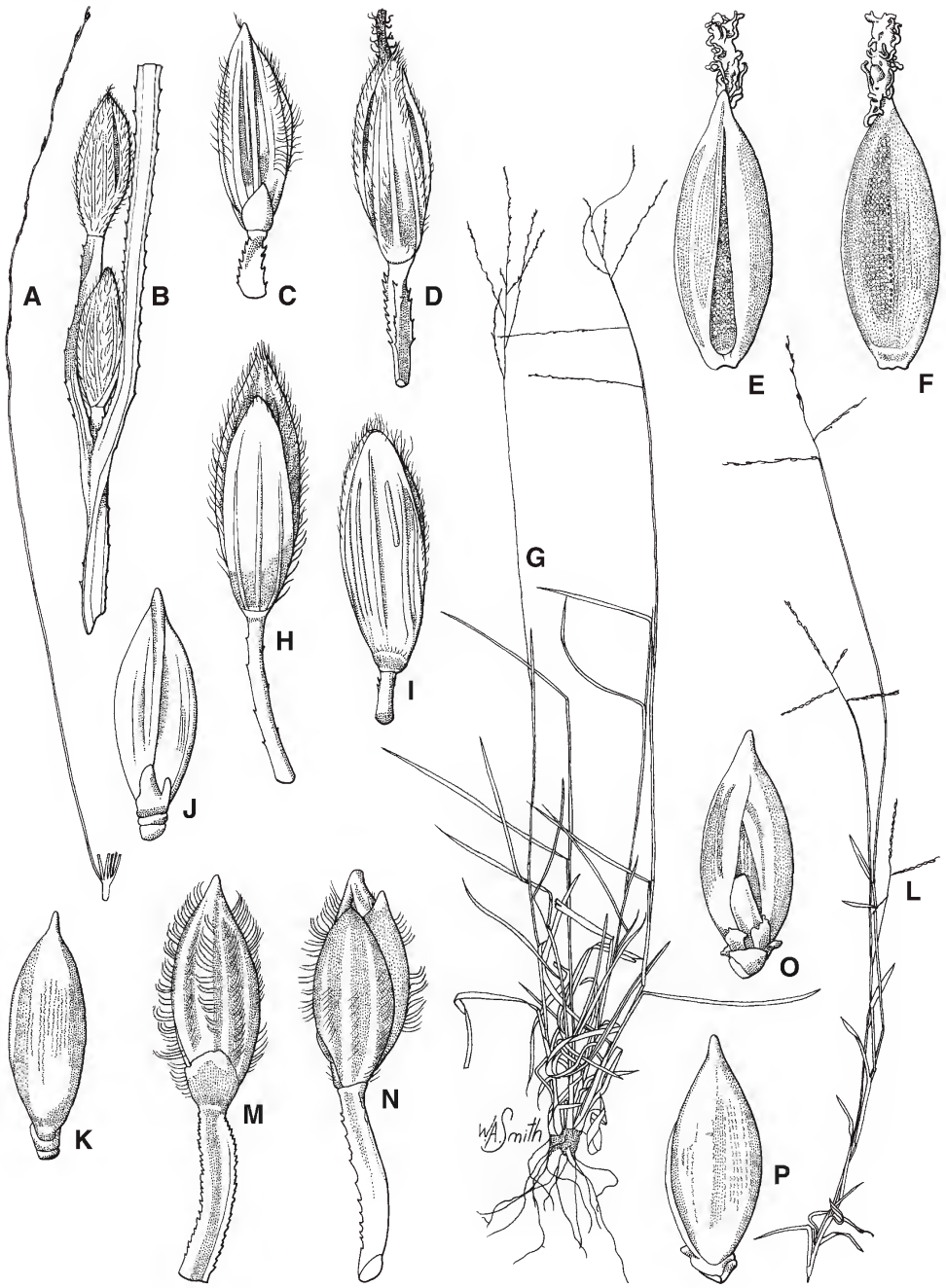


Fig. 1. ***Digitaria basaltica***. A. portion of inflorescence showing branching of racemes and one complete raceme × 0.4. B. spikelet pair × 0.8. C. spikelet, lower glume facing ×12. D. spikelet, upper glume facing × 12. E. upper floret, front view × 18. F. upper floret, back view × 18. ***D. cowiei***. G. habit × 0.4. H. spikelet, upper glume facing × 24. I. spikelet, lower glume facing × 24. J. upper floret, front view × 24. K. upper floret, back view × 24. ***D. dolleryi***. L. habit × 0.4. M. spikelet, lower glume facing × 16. N. spikelet, upper glume facing × 16. O. upper floret, front view × 18. P. upper floret, back view × 18. A–F from *Fensham 2183* (BRI), G–K from *Cowie 1752 & Wilson* (BRI); L–P from *Dollery 354* (BRI). Del. W.Smith.

***Phenology*:** Flowering May.

***Notes*:** This is a distinctive annual grass with very small hairy spikelets. It differs from *Digitaria velutina* (Forssk.) P.Beauv. by having fewer spikelets on the lowermost primary inflorescence branch and by the upper glume being 5-nerved as opposed to 3-nerved. It is a member of *Digitaria* section *Digitaria* (Webster 1983).

***Etymology*:** Named for Ian Cowie, botanist at the Northern Territory Herbarium, Darwin. He has worked in the Top End of the Northern Territory for the past 21 years and has a wide experience in flora survey and in the taxonomy and ecology of plants from that region.

Digitaria dolleryi B.K.Simon, **species nova** *D. imbricatae* R.D.Webster similis sed spiculis minoribus differt (2–2.3 mm vs. 2.5–3.5 mm). **Typus:** Queensland. Warrego District: Chesterton National Park, 18 April 2002, *C.Dollery 354* (holo: BRI).

Digitaria sp. (Chesterton NP C.Dollery 354) (*ined.*)

Annual. Flowering culms decumbent to caespitose, 20–40 cm tall, 3–5-noded. Leaves: sheaths glabrous; ligule 0.5–0.8 mm long; blades flat, 1–2.5 cm long, 1–2 mm wide, glabrous. Inflorescence 3–6 cm long, on a distinct central axis. Racemes 2–5, usually bearing spikelets to base, 2–5 cm long. Pedicels 1–5 mm long, apices cupuliform. Spikelets 22–26 on a typical lowermost primary branch, hairy, paired, elliptic, 2–2.3 mm long, 0.9–1.1 mm wide. Lower glume 0.7 mm long, truncate, nerveless, hyaline, smooth, glabrous, truncate. Upper glume 1.9–2 mm long, as long as spikelet, oblong, 3-nerved, villous with pinkish hairs, acute. Lower floret: lemma 1.8–2.1 mm long, villous with pinkish hairs, 7-nerved; palea absent. Upper floret subequal to the lower floret; lemma 1.8–2.1 mm long, acute to acuminate, muticous; palea as long as and enclosed by lemma. **Fig. 1.**

***Distribution and habitat*:** Only known from a single record from central Chesterton National Park, Queensland (**Map 4**) where it was reported as occurring in *Callitris* woodland with a grassy ground stratum.

***Phenology*:** Flowering April.

***Notes*:** This species is a member of *Digitaria* section *Digitaria* (Webster 1983). It is similar to *D. imbricata* R.D.Webster by having a short web of brown hairs, but differs by the smaller spikelets.

***Etymology*:** Named for the collector of the type, Colin Dollery, Queensland Parks and Wildlife Service, Queensland Dept. of Environment and Natural Resources, Cairns.

Digitaria sharpeana B.K.Simon, **species nova** *D. leucostachyae* (Domin) Henrard et *D. gibbosae* (R.Br.) P.Beauv. similis sed spiculis minoribus hirsutis et *D. orariae* R.D.Webster similis sed spiculis binatim differt. **Typus:** Queensland. Moreton District: Sunnybank, Brisbane, 24 March 1934, *S.T.Blake 5300* (holo: BRI; iso: NSW, CANB).

Digitaria sp. (Sunnybank S.T.Blake 5300) (*ined.*)

Perennial, very shortly rhizomatous. Flowering culms caespitose, 40–90 cm tall, 4–6-noded. Leaf sheaths hairy on margins towards the apex. Ligule 0.1–0.15 mm long. Leaf blades flat, 5–30 cm long, 2–3 mm wide, glabrous, smooth. Inflorescence 9–20 cm long, consisting of a single raceme or digitate or subdigitate (rarely). Racemes 1 or 2 (rarely), 9–20 cm long. Pedicels 1–4 mm long, apices discoid. Spikelets homomorphous, 50–120 on a typical lowermost primary branch, glabrous, in 3's, elliptic, 2–2.5 mm long, 0.75–1 mm wide. Lower glume absent. Upper glume 1.7–2 mm long, slightly shorter than spikelet to noticeably shorter than spikelet, elliptic, 3-nerved, glabrous, acute. Lower floret: lemma 2.5–3 mm long, glabrous, 7-nerved; palea absent. Upper floret subequal to the lower floret; lemma 2.5–3 mm long, brown to black, chartaceous, uniformly striate, elliptic, acute, muticous; palea as long as lemma. Caryopsis *c.* 2.5 mm long. **Fig. 2.**

***Additional specimens examined*: Queensland**. Port Curtis District: 21.5 km SE of Miriam Vale, Aug 1996, *Thompson MIR345 & Price* (BRI); 17 km N of Miriam Vale, Jul 1996, *Thompson MIR344 & Turpin* (BRI). Wide Bay District: just below summit of Mt Benarige, S.F. 57, Mar 1996, *Grimshaw PG2332 & Turpin* (BRI, CANB, K, NSW).

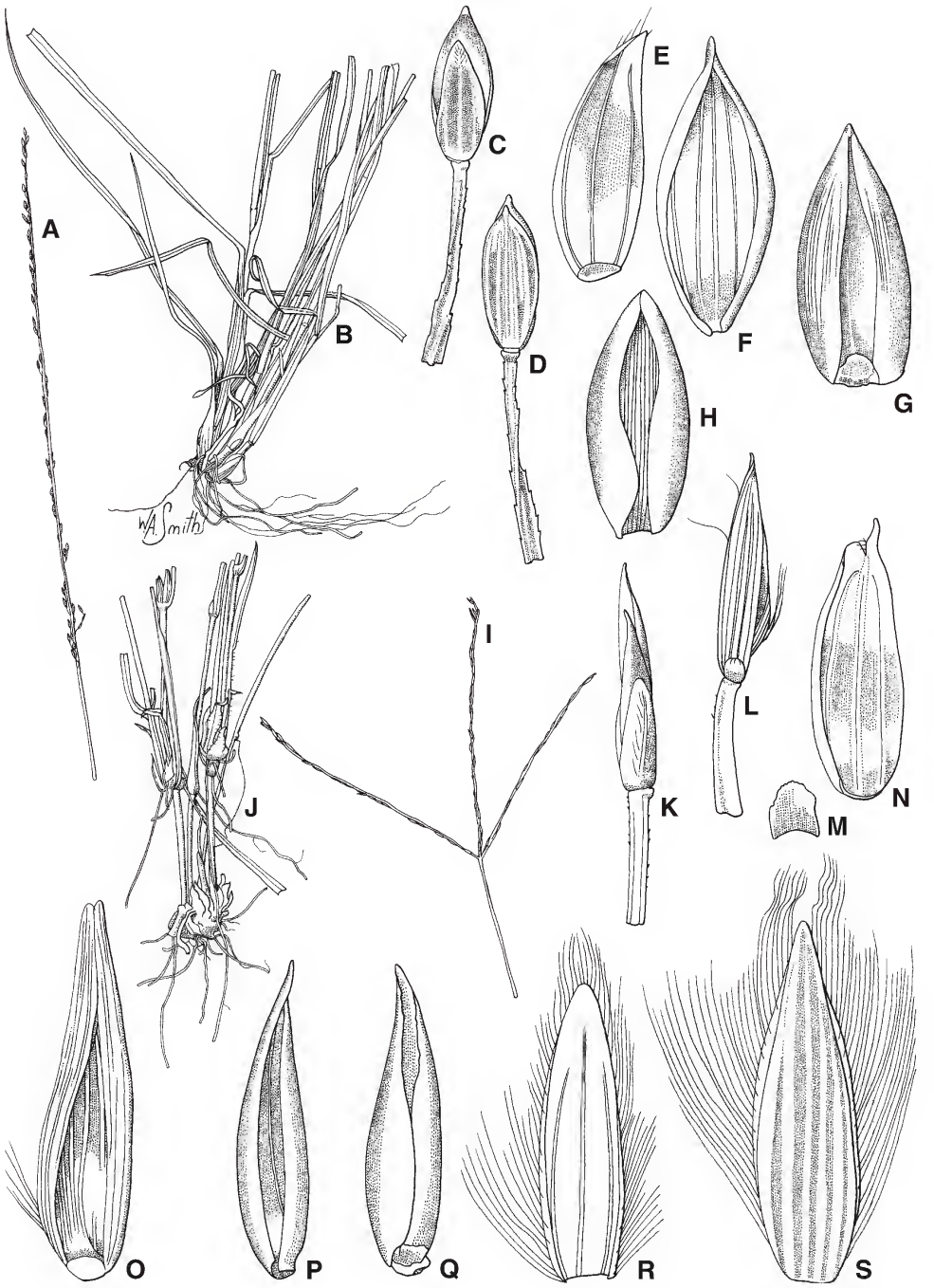


Fig. 2. ***Digitaria sharpeana***. A. inflorescence × 0.6. B. base of plant × 0.6. C. spikelet, upper glume facing x 10. D. spikelet, lower lemma facing × 10. E. upper glume × 20. F. lower lemma × 20. G. upper lemma × 20. H. upper palea × 20. (D–H, all front view). ***D. veldkampiana***. I. inflorescence × 0.6. J. base of plant × 0.6. K. spikelet, upper glume facing × 8. L. spikelet, lower glume facing × 8. M–Q. sessile spikelet, all front view and × 16. M. lower glume. N. upper glume. O. lower lemma. P. upper lemma. Q. upper plaea. R–S. pedicelled spikelet, all × 16. R. upper glume, front view. S. lower lemma, back view. A–H from *Blake 5300* (BRI); I–S from *Blake 21286* (BRI). Del. W.Smith.

***Distribution and habitat*:** South-east Queensland (Port Curtis, Wide Bay and Moreton Pastoral Districts) (**Map 4**). It occurs in open forest of *Eucalyptus* spp. and *Corymbia* spp. on sandstone and sandy loams.

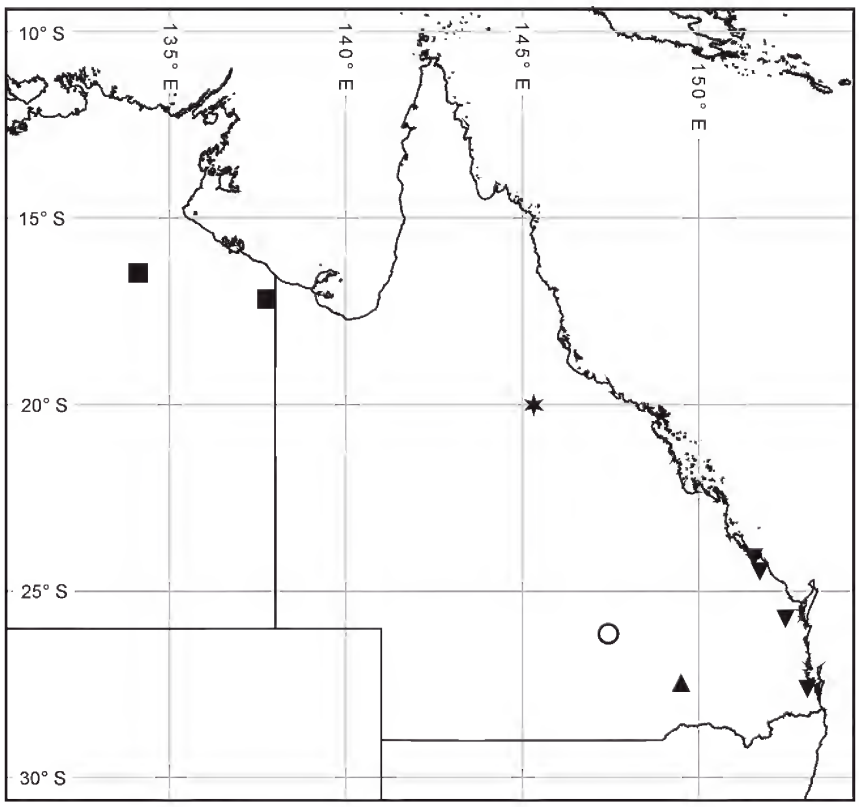
***Phenology*:** Flowering July to August and March.

***Notes*:** This species is a member of *Digitaria* section *Monodactylae* Henrard (Webster 1983), together with *D. leucostachya* (Domin) Henrard, *D. gibbosa* (R.Br.) P.Beauv. and *D. oraria* R.D.Webster. It differs from *D. leucostachya* and *D. gibbosa* by the spikelets not being obviously hairy and from *D. oraria* by the spikelets being arranged in pairs. It differs from the superficially similar *D. stenostachya* (Benth.) Hughes and *D. veldkampiana* B.K.Simon by the racemes usually being single (rarely paired). The specimens of *D. sharpeana* were formerly placed with *D. ramularis* (Trin.) Henrard in the Queensland Herbarium, but they are not at all similar to that species.

***Etymology*:** Named for Philip Ridley Sharpe, formerly of the Queensland Herbarium, a keen collector, botanist and translator of German botanical literature.

Digitaria veldkampiana B.K.Simon, **species nova** *D. heteranthae* (Hook.f.) Merr. similis sed spicularum pedicellatarum lemmate inferiore sine setis differt. **Typus:** Queensland. Maranoa District: SE of Surat, Thomby Range, 21 May 1960, *S.T.Blake 21286* (holo: BRI; iso: L, MEL).

Digitaria sp. (Surat S.T.Blake 21286) (*ined.*)



Map 4. Distribution in northern Australia of *Digitaria basaltica* ✶, *Digitaria sharpeana* ▼, *Digitaria veldkampiana* ▲, *Digitaria dolleryi* ○ and *Digitaria cowiei* ■

Perennial, rhizomatous. Flowering culms decumbent, 30–50 cm tall, 4–8-noded. Leaf sheaths hairy at the base. Ligule 1–1.5 mm long. Leaf blades flat, 2–6 cm long, 2–4 mm wide, glabrous, smooth. Inflorescence 6–10 cm long, digitate or subdigitate; racemes 2–4, usually bearing spikelets to the base, 6–10 cm long. Pedicels 0.7–3 mm long, apices truncate. Spikelets heteromorphous, 26–32 on a typical lowermost primary branch, hairy, paired, lanceolate, 3.5–4 mm long, 1–1.2 mm wide. Sessile spikelet: lower glume *c.* 0.2 mm long, truncate, nerveless, membranous, smooth, glabrous, truncate. Upper glume *c.* 2.5 mm long, slightly shorter than spikelet, lanceolate, 5-nerved, glabrous to hairy (much hairier in some pedicelled spikelets), villous, acute. Lower floret: lemma 3.5–4 mm long, glabrous to hairy (much hairier in some pedicelled spikelets), with indumentum equalling the spikelet length, 7-nerved; palea vestigial, or absent. Upper floret subequal to the lower floret; lemma 3.5–4 mm long, brown, chartaceous, finely muricate, lanceolate, acute, muticous; palea as long as and enclosed by lemma. Pedicelled spikelets: lower floret lemma without bristles. **Fig. 2.**

***Distribution and habitat*:** Known from the Thomby Range in southern Queensland (**Map 4**) where it was recorded as occurring in *Eucalyptus* and *Acacia* woodland on very shallow soil overlying lateritised surface rock.

***Phenology*:** Flowering May.

***Notes*:** This species is a member of *Digitaria* section *Digitaria* (Webster 1983), together with *D. ctenantha* (F.Muell.) Hughes, *D. didactyla* Willd., *D. radicosa* (C.Presl) Miq., *D. ciliaris* (Retz.) Koeler, *D. bicornis* (Lam.) Roem. & Schult., *D. setigera* Roth. ex Roem. & Schult., *D. sanguinalis* (L.) Scop and *D. stenostachya*. The only specimen of this species was formerly placed by Webster (1987) in *D. heterantha*; however, an examination of a drawing of the type of this species in Veldkamp (1973) indicates that the pedicelled spikelet usually has bristles, whereas they are absent in the pedicelled spikelet of *D. veldkampiana*.

***Etymology*:** Named for Dr Jan Frits (JeF) Veldkamp, of the Netherlands Centre for Biodiversity Naturalis, Leiden University, a specialist in the grass family of the South-East Asian region.

Apart from the new species of *Digitaria*, there are other name changes that apply to this genus as a result of more critical study of the genus while preparing the *FOA* treatment. In the four published editions of the census of the Queensland Flora (Simon 1994, 1997, 2002; Simon *et al.* 2007) there has been listed a species under the phrase name *Digitaria* sp. (Mt Mulligan J.R.Clarkson 5821) from north Queensland and the Northern Territory. This species has usually incurved and terete leaves and an inflorescence of one to many racemes in which the spikelets have a unique brown to black colour of the upper floret. The leaves can sometimes be very narrow and filiform and the branches fascicled at the nodes. When the species *D. breviglumis* (Domin) Henrard was being written up it was discovered that this name had been misapplied to a group of species that had included *D. diminuta* Hughes and *D. fumida* S.T.Blake and that the type of *D. breviglumis* was in fact a good match for *Digitaria* sp. (Mt Mulligan J.R.Clarkson 5821). The names *D. diminuta* and *D. fumida* have been reinstated for similar, but nevertheless different, species all of which possess an upper glume less than half the spikelet length; these can be distinguished by the following key.

1 Inflorescence with few branches, sometimes only 1 2
1. Inflorescence with many branches, at least 8 3

2 Inflorescence with 1–4 branches; lower lemma 5-nerved; upper glume nerveless; sometimes with many culm branches fascicled at nodes . . . . **D. breviglumis**
2. Inflorescence with at least 4 branches; lower lemma 7-nerved; upper glumes 3-nerved; culm branches never fascicled at nodes . . . . . **D. diminuta**

3 Lower glume absent . . . . . **D. orbata**
3. Lower glume present . . . . . **D. fumida**

Both *Digitaria diminuta* and *D. fumida* were not included in the four editions of the census of the Queensland Flora (Simon 1994, 1997, 2002; Simon *et al.* 2007) and the entry in Jacobs *et al.* (2008) for *D. breviglumis* refers to *D. diminuta*. *Digitaria breviglumis* differs from *D. diminuta* and *D. fumida* by its habit of 1–4 inflorescence branches, narrow leaf blades and sometimes fascicled culm branches and generally smaller stature.

As well as the diagnostic key to this group of species, descriptions and synonymy of the four related species will assist in the clarification of their circumscription.

Digitaria breviglumis (Domin) Henrard, *Monogr. Digitaria* 92 (1950); *Panicum breviglume* Domin, *Biblioth. Bot.* 85: 298 (1915). **Type:** Queensland. North Kennedy District: Dividing Range, west of Pentland, February 1910, *K.Domin* [*1058, 1059*] (holo: PR [photos BRI]; iso: BRI, K [photo BRI]).

Digitaria sp. (Mt Mulligan J.R.Clarkson 5821) (Simon 1994: 255, 1997: 158, 2002: 152; Simon *et al.* 2007: 153).

***Illustrations*:** Henrard (1950: 93); Tothill & Hacker (1983: 194, fig 4).

Perennial, rhizomatous. Flowering culms caespitose, 30–60 cm tall, 5–7-noded. Leaves: sheaths glabrous; ligule 0.3–0.5 mm long; blades flat or involute (mostly), 2.5–7.5 cm long, 0.5–0.8 mm wide, glabrous, smooth to scabrous. Inflorescence 2–10 cm long, on a distinct central axis or consisting of a single raceme, exerted at maturity; racemes 1–4, usually bearing spikelets to base, 1.5–2 cm long; central axis 0.5–1 cm long. Pedicels 0.6–2.8 mm long. Spikelets 10–15 on a typical lowermost primary branch, glabrous, paired, elliptic, 1.3–1.6 mm long, 0.5–0.6 mm wide. Glumes 2, slightly unequal; lower glume 0.2–0.4 mm long, obovate, nerveless, membranous, smooth, glabrous, truncate; upper glume 0.3–0.5 mm long, ovate, nerveless, glabrous, truncate. Lower floret: lemma 1.3–1.6 mm long, glabrous, 5-nerved, with nerves distinct; palea absent. Upper floret subequal to the lower floret; lemma 1.3–1.5 mm long, brown to black, cartilaginous, very finely transversely rugose, elliptic, acute, muticous.

***Additional selected specimens examined*: Northern Territory.** Darwin & Gulf: McMinns Bluff, near Pine Creek, Jan 1991, *Cowie 1476 & Dunlop* (BRI, CANB, DNA, MEL, PERTH). Barkly Tableland: Border Water hole, July 1971, *Latz 1628* (BRI, CANB). **Queensland.** Cook District: Mt Mulligan, Apr 1985, *Clarkson 5869* (BRI, CNS, L, MEL, NSW, PERTH). Burke District: 39.5 km N of Musselbrook, May 1995, *Johnson MRS835 & Thomas* (BRI, K). South Kennedy District: 16.5 km NNE of Yarrowmere, Apr 1992, *Thompson BUC647 &.Simon* (AD, BRI, CANB, NSW). Mitchell District: 67 km NE of Aramac, Mar 2000, *Thompson MUT123* (BRI). Leichhardt District: Snake Range N.P., SW of Springsure, May 1995, *McKosker 111* (BRI).

***Distribution and habitat*:** Tropical Northern Territory and Queensland (**Map 5**). It grows in a range of mixed *Eucalyptus*, *Corymbia*, *Acacia* and *Melaleuca* woodlands on sandstone and skeletal soils.

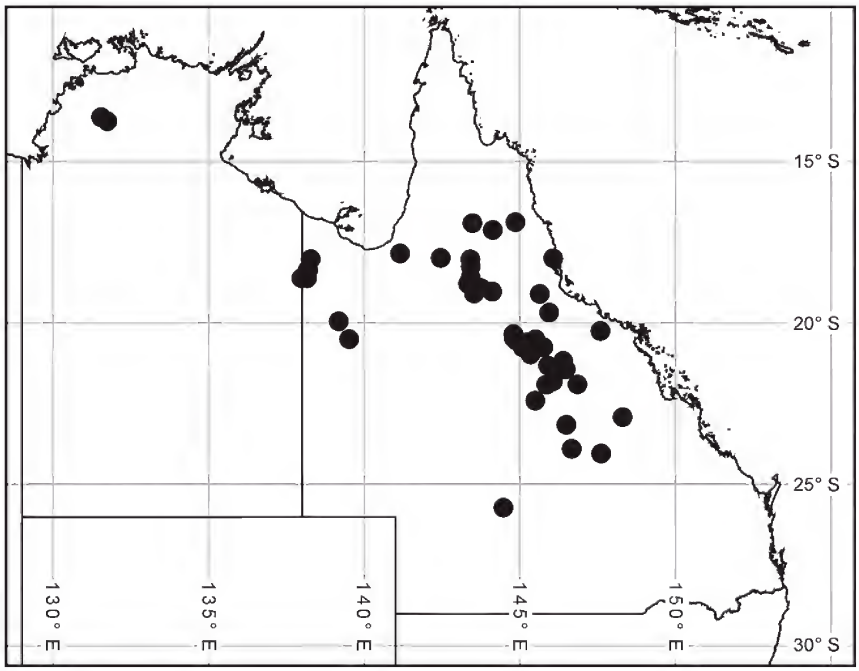
***Phenology*:** Flowering January to August; also October.

***Notes*:** *Digitaria breviglumis* is distinguished on the basis of its usually incurved and terete leaves and an inflorescence of one to many racemes in which the spikelets have a unique brown to black colour of the upper floret. The leaves can sometime be very narrow and filiform and the branches fascicled at the nodes.

Digitaria diminuta Hughes, *Bull. Misc. Inform. Kew* 1923: 312 (1923). **Type:** New South Wales. McIntyre River, *s.dat.*, *J.E.Ker s.n.* (holo: K [photo BRI]; iso: BRI).

***Illustrations*:** Henrard (1950: 187); Tothill & Hacker (1983: 194, fig 12); Jacobs *et al.* (2008: 214 [as *D. breviglumis*] and 219 [as *D. orbata*]).

Perennial. Flowering culms caespitose, 10–65 cm tall, 2–4-noded. Leaves: sheaths hairy or glabrous; ligule 0.4–0.8 mm long; blades 3–9 cm long, 0.2–0.5 mm wide, hairy or glabrous. Inflorescence on a distinct central axis; racemes 4–10, usually bearing spikelets to base, not long and rigid, 3.5–15 cm long. Pedicels 0.5–1 mm long. Spikelets 34–80 on a typical lowermost primary branch, glabrous, paired, elliptic, 1.3–1.9 mm long, 0.55–0.75 mm wide. Glumes 2; lower glume 0.16–0.43 mm long, ovate, nerveless, membranous, smooth, glabrous, cleft or obtuse or rounded; upper glume 0.4–0.9 mm



Map 5. Distribution in northern Australia of *Digitaria breviglumis*

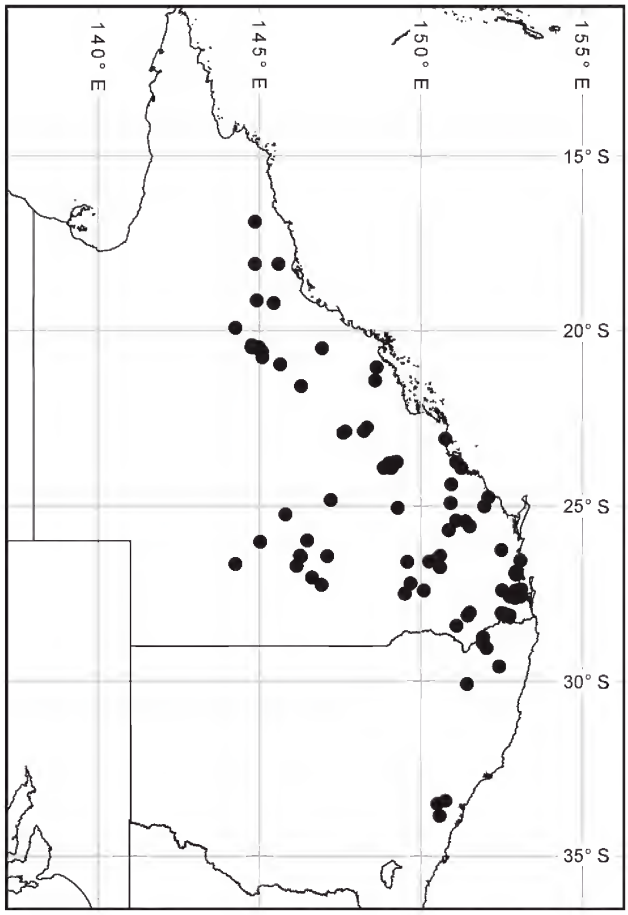
long, ovate to oblong, 3-nerved, with ciliate margins and submargins, glabrous, rounded or truncate or cleft, muticous. Lower floret: lemma 1.2–1.8 mm long, glabrous, with a glabrous first internerve space, with equal internerve spacing or with the first internerve space wider than the second, with margins or submargins glabrous, 7-nerved; palea lanceolate or ovate. Upper floret overtopping the lower floret; lemma 1.2–1.8 mm long, yellow, cartilaginous, muricate, elliptic to obovate, acute, muticous.

***Additional selected specimens examined*: Queensland**: Cook District: Mt Mulligan, Apr 1985, *Clarkson 5785* (BRI, CNS). Burke District: near source of Poison Creek, about 90 miles [144 km] N of Hughenden, Mar 1935, *Blake 8474* (BRI, CANB, K, NSW). North Kennedy District: *c.* 5 miles [8 km] SE of Clarke River, Telegraph Station, July 1954, *S.T.Blake 19434* (BRI, CANB, NSW, PERTH). South Kennedy District: 21 km NW of Hyde Park Homestead, Apr 1992, *Thompson BUC569A & Simon* (AD, BRI, DNA, NSW, PERTH). Mitchell District: White Mountains N.P., Apr 2000, *Thompson HUG734* (BRI). Leichhardt District: N slope of Blackdown Tableland [N.P.], S of Dingo, May 1976, *Jacobs 2592 & Rodd* (BRI, NSW). Warrego District: Charleville, Apr 1936, *Blake 11066* (BRI, DNA, PERTH). Maranoa District: Boatman Station, Mar 1947, *Everist 2833* (BRI, K, NSW, US). Burnett District: 7–8 miles [11–13 km] S of Eidsvold, Mar 1966, *Blake 22643* (AD, BRI, CANB, NSW, PERTH). Wide Bay District: 11 miles [17 kms] NW of Gin Gin, Mar 1966, *Blake 22410* (AD, BRI, CANB, DNA, K, L, MO, NSW, PERTH). Darling Downs District: N of Jackson, Mar 1953, *Blake 19138* (AD, BRI, K, MO, NSW). Moreton District: Mt Ngungun [Glasshouse Mountains N.P.], Mar 1931, *Hubbard 5925* (BRI, K). **New South Wales.** Slopes of Blue Mts towards Katoomba, Apr 1931, *Hubbard 8435* (BRI, K, NSW).

***Distribution and habitat*:** Tropical and subtropical Queensland to central New South Wales (**Map 7**). It grows in a range of *Eucalyptus*, *Corymbia*, *Acacia*, *Callitris* and *Melaleuca* woodlands on a variety of soils.

***Phenology*:** Flowering throughout the year.

***Notes*:** *Digitaria diminuta* differs from *D. breviglumis* by having at least four inflorescence branches and a 7-nerved lower lemma. In addition, the upper glume is 3-nerved (nerveless in *D. breviglumis)* and the culm branches are never fascicled at the nodes.



Map 6. Distribution in eastern Australia of *Digitaria diminuta*

Digitaria orbata Hughes, *Bull. Misc. Inform. Kew* 1923: 312 (1923). **Type:** Queensland. North Kennedy District: Herbert's Creek, *s.dat.*, *Bowman s.n.* (holo K [photo BRI]; iso: BRI, MEL).

***Illustrations*:** Henrard (1950: 508); Tothill & Hacker (1983: 194, fig 18).

Perennial, rhizomatous. Flowering culms caespitose, 40–85 cm tall, 3–5-noded. Leaves: sheaths glabrous; ligule 1.6–4 mm long; blades flat, 6–25 cm long, 1.8–5.5 mm wide, glabrous, scabrous. Inflorescence 2–14 cm long, on a distinct central axis; racemes 2–10, usually bearing spikelets to base, not long and rigid, 7–16 cm long. Pedicels 0.4–0.8 mm long. Spikelets 30–70 on a typical lowermost primary branch, hairy or rarely glabrous, paired, elliptic, 1.3–1.8 mm long, 0.47–0.8 mm wide. Lower glume absent; upper glume 0.2–0.6 mm long, less than half the length of spikelet, ovate to elliptic, nerveless, glabrous, rounded to truncate or cleft. Lower floret: lemma 1.1–1.6 mm long, glabrous or occasionally with a few villous hairs on the area between the last lateral nerve and margin, 3–5-nerved; palea vestigial to absent. Upper floret overtopping the lower floret or subequal to the lower floret; lemma 1.2–1.7 mm long, brown, cartilaginous, muricate, elliptic, apically rounded to acute, apiculate.

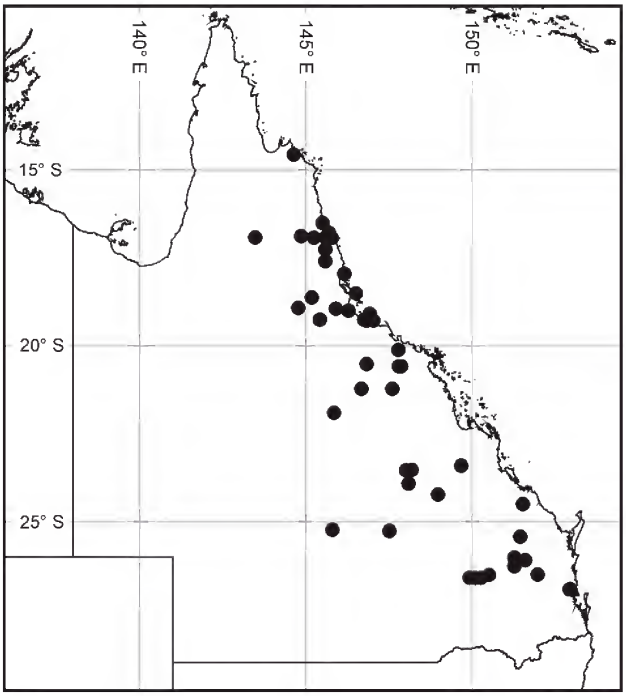
***Additional selected specimens examined*: Queensland.** Cook District: Mt Mulligan, Apr 1985, *Clarkson 5883* (BRI, CNS, MEL, PERTH). North Kennedy District:

Dunk Island, Aug 1951, *Blake 18875* (BRI, CANB). South Kennedy District: Along the Collinsville – Mt Coolon Road, 800 m southwest of its junction with Caves Creek, Jan 1996, *Pollock 299 & Champion* (BRI, CANB). Leichhardt District: Humboldt, S of Blackwater, Jan 1997, *Fensham 2981* (BRI). Port Curtis District: Dawes Range, Apr 1937, *White 10813* (BRI). Mitchell District: 93 km N of Langlo Crossing, July 1975, *Beeston 1356C* (BRI). Warrego District: Mt Brandon Station, Apr 1936, *Blake 11149* (BRI, CANB, DNA, PERTH). Burnett District: near Durong, May 1940, *Blake 14245* (BRI, CANB). Darling Downs District: Palardo, Feb 1935, *Blake 7640* (BRI).

***Distribution and habitat*:** *Digitaria orbata* is broadly sympatric with *D. fumida* in tropical and subtropical Queensland (**Map 7**) where it grows in a range of woodlands on a variety of soils.

***Phenology*:** Flowering March to August.

***Notes*:** This species differs from *Digitaria fumida* only by lacking a lower glume. In *AusGrass* (Sharp & Simon 2002) there are a couple of erroneously cited illustrations from Wheeler *et al.* (1990) with attribution to the wrong species. The illustration under *D. orbata* is *D. ischaemum* and the one under *D. hystrichoides* is *D. orbata*. *D. orbata* does not occur in New South Wales and the record by Jacobs *et al.* (2008) refers to *D. diminuta*.



Map 7. Distribution in Queensland of *Digitaria orbata*

Digitaria fumida S.T.Blake, *Proc. Roy. Soc. Queensland* 84: 62 (1973). **Type:** Queensland. Moreton District: Northgate, Brisbane, 15 May 1937, *S.T.Blake 12970* (holo: BRI).

Panicum parviflorum R.Br. var. *pilosum* Benth. (as '*pilosa*'), *Fl. Austral.* 7: 471 (1878). **Type:** Queensland. Moreton District: Moreton Bay, *s.dat., F.M.Bailey [41]* (holo: MEL; iso: BRI; K, L *n.v.*).

Perennial, rhizomatous. Flowering culms decumbent, 30–80 cm tall, 3–10-noded. Leaves: sheaths hairy to glabrous; ligule 0.5–2.7 mm long; blades flat to involute, 4–18 cm long, 1.5–4.5 mm wide, hirsute or glabrous, smooth to scabrous. Inflorescence 1.5–7 cm long, on a distinct central axis; racemes 2–10, usually bearing spikelets to base, 3.5–15 cm long. Pedicels 0.5–1 mm long. Spikelets 34–80 on a typical lowermost primary branch, glabrous, paired or in 3's, elliptic, 1.3–1.9 mm long, 0.55–0.75 mm wide; lower glume 0.16–0.43 mm long, ovate, nerveless, membranous, smooth, glabrous; upper glume 0.4–0.9 mm long, ovate to oblong, 0 or 1-nerved (lateral nerves occasionally poorly developed), with ciliate margins and submargins, glabrous. Lower floret: lemma 1.2–1.8 mm long, glabrous, 3–7-nerved; palea vestigial or absent. Upper floret overtopping the lower floret; lemma 1.2–1.8 mm long, brown, cartilaginous, muricate, elliptic to obovate, acute, mucronate.

***Additional selected specimens examined*: Queensland.** Cook District: 6 km SW of Cape Flattery, May 1990, *Clarkson 8626 & Neldner* (BRI, K, NSW). Burke District: Poison Creek, Feb 1931, *Hubbard 7727 & Winders* (BRI, K). North Kennedy District: Mt Abbot, Aug 1992, *Bean 4831* (BRI). South Kennedy District: 5 km along Burton Downs – Goonyella Road, May 1997, *Thompson 295* (BRI). Leichhardt District: Laglan Road, NW of Clermont, Jun 1999, *Johnson 126 & Turpin* (BRI). Port Curtis District: Curtis Island, Mar 1966, *Blake 22512* (AD, BRI, CANB, DNA, K, MO, PERTH). Maranoa District: Mt Moffatt N.P., Apr 1996, *Addicott 138* (BRI). Burnett District: Narayen, Mar 1971, *Pederson N167* (BRI). Wide Bay District: between Childers and Howard, Mar 1966, *Blake 22404* (BRI, CANB, NSW). Darling Downs District: Kindon Station, Dec 1938, *Smith 604* (BRI). Moreton District: Northgate, May 1937, *Blake 12970* (AD, BRI, CANB, DNA, K, L, MO, NSW).

***Distribution and habitat*:** *Digitaria fumida* is broadly sympatric with *D. orbata* in tropical and subtropical Queensland (**Map 8**) where it grows in a range of *Eucalyptus* woodlands on mainly sandy soils. It is often abundant in the summer season following fire in the previous year.

***Phenology*:** Flowering mostly November to August.

***Notes*:** This species differs from *Digitaria orbata* by having a lower glume.

5. A new species of *Entolasia* Stapf

Entolasia minutifolia B.K.Simon, **species nova** *E. marginatae* (R.Br.) Hughes similis sed laminis foliorum 1–2.5 cm brevioribus rigidis differt. **Typus:** Queensland. Darling Downs District: between Miles and Drillham, 19 February 1935, *S.T.Blake 7709* (holo: BRI; iso: AD, CANB, DNA, NSW, PERTH).

Entolasia sp. A, *Flora of Australia* 43: 353, Map 1114 (2002).

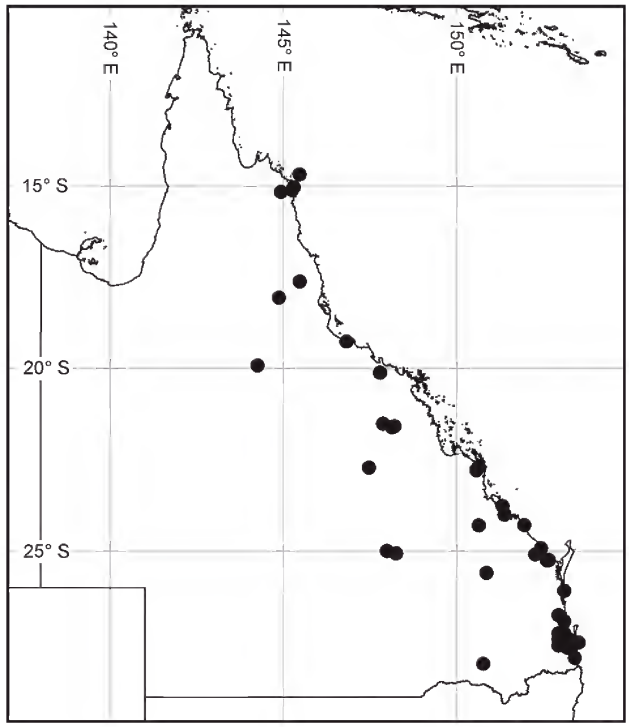
Entolasia sp. (Miles S.T.Blake 7709) (Simon *et al.* 2007: 155).

Flowering culms 5–45 cm tall, 2–6-noded. Ligule *c.* 0.2 mm long. Leaf blades flat, 1–2.5 cm long, 1.5–3.5 mm wide. Inflorescence 0.6–3 cm long. Primary branches 0.4–0.9 cm long, 0.2–0.3 cm wide. Spikelets 3–4 on a typical lowermost primary branch, elliptic, 2.2–2.5 mm long, 1–1.3 mm wide. Glumes: lower glume 0.4 mm long, nerveless; upper glume 2.2–2.5 mm long, lanceolate, muticous. Lower floret: lemma 2.3–2.4 mm long. Upper floret: lemma 2.1 mm long, yellow or brown, smooth, acute; palea smooth.

***Additional specimens examined*: Queensland.** Darling Downs District: Near Kogan, Feb 1938, *Blake 13266* (BRI); *ditto loc.*, Mar 1953, *Blake 19180* (BRI, CANB); 5 miles [8 km] N of Karara on road to Leyburn, Apr 1971, *Blake 23596* (BRI, K, MO, NSW); Ballandean [Girraween] N.P., NE of Wallangarra, Jan 1940, *Blake 14137* (BRI, CANB, NSW); S.F.101 Devine, Honeysuckle Creek, 20 km NE of Inglewood, Oct 2006, *Forster PIF32122 & Thomas* (BRI).

***Distribution and habitat*:** Restricted to the Darling Downs District of Queensland (**Map 9**) where it grows in *Eucalyptus*, *Acacia* and *Callitris* forests and woodlands on sandy soils.

***Phenology*:** Flowering October to April.



Map 8. Distribution in Queensland of *Digitaria fumida*

***Notes*:** This species differs from *Entolasia marginata* by the much smaller stature with leaf blades less than 3 cm long and rigid in texture. It may prove to be a form of the latter species; however, molecular study is required to determine this. In the meantime the characteristic minute leaf blades and fairly narrow geographic range of this entity are factors persuading me to recognise it as a separate species.

***Etymology*:** Named for the minute leaf blades.

6. A new species and a new name application in *Isachne* R.Br.

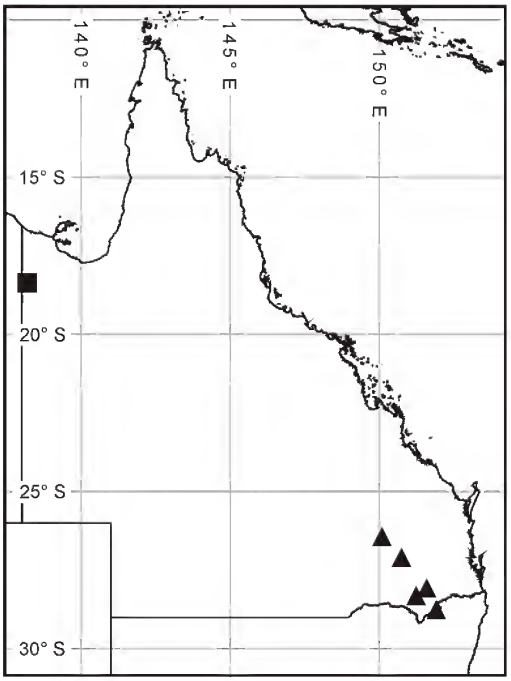
The latest treatment of Australian *Isachne* species (Sharp & Simon 2002) has four species. One (*I. sharpii* B.K.Simon) is treated as new in this paper. The name *I. pulchella* Roth in Roem. & Schult. has been misapplied to another species *I. minutula* (Gaudich.) Kunth in a recent revision of *Isachne* sect. *Isachne* for Malesia (Iskandar & Veldkamp 2004).

Isachne minutula (Gaudich.) Kunth, *Rév. Gram.* 2: 407, t.117 (1831); *Panicum minutulum* Gaudich., *Freyc., Voy. Uranie* 410 (1829); *Isachne miliacea* Roth var. *minutula* (Gaudich.) Fosberg & Sachet, *Micronesica* 18: 55 (1984). **Type:** Marianas Islands, *s.dat.*, *Gaudichaud s.n.* (holo: P, *n.v.*).

Isachne pulchella auct., *non* Roth in Roem. & Schult. (Iskandar & Veldkamp 2004: 168).

***Illustrations*:** Bailey (1913: 585), as *I. myosotis* Nees; Sharp & Simon (2002) as *I. pulchella* Roth in Roem. & Schult.

Annual. Flowering culms 3–35 cm tall, 2–5-noded. Ligule a fringe of hairs, 0.8–1.2 mm long. Leaf blades 2–5 cm long, 2–8 mm wide. Inflorescence 2–12 cm long. Primary branches 0.6–5 cm long. Spikelets 4–14 on a typical lowermost primary branch, with the upper floret fertile, dorsally compressed, 1–1.6 mm long, 0.7–0.9 mm wide; lower glume elliptic, 1–1.6 mm long, 5–7-nerved, glabrous; upper glume 1.1–1.5 mm long, elliptic to obovate, 5–



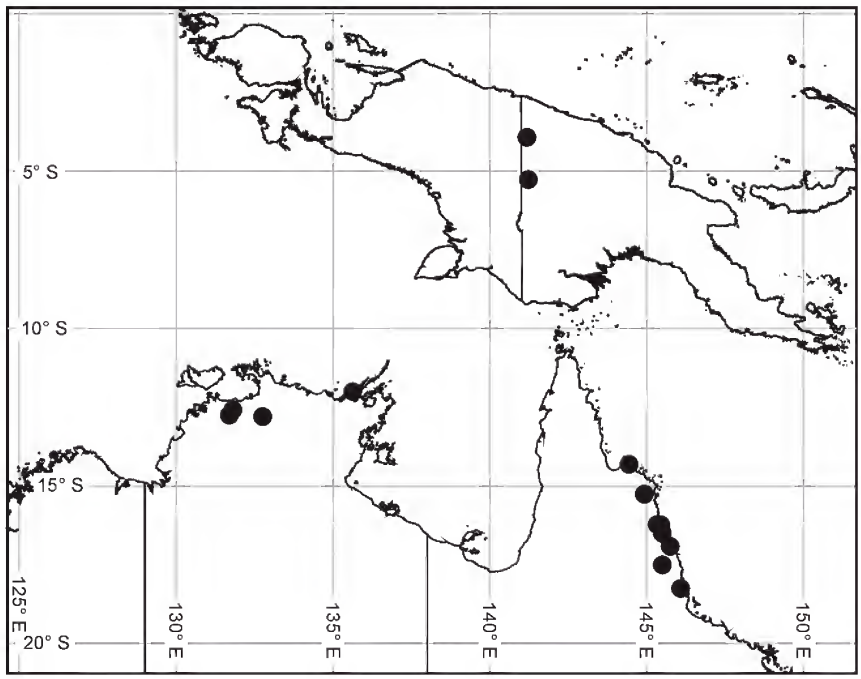
Map 9. Distribution in Queensland of *Entolasia minutifolia* ▲ and *Paspalidium johnsonii* ■

7-nerved, glabrous or scabrous. Lower floret male; lemma 1–1.5 mm long, 0.7–0.9 mm wide, chartaceous, 3-nerved, with apex acute to rounded. Upper floret bisexual, subequal to the lower floret; lemma 1–1.3 mm long, white, smooth; palea smooth. Anthers 0.8–0.9 mm long.

***Additional selected specimens examined*: Western Australia.** Kimberley: Kimbolton Homestead, May 1993, *Mitchell 3093* (BRI, PERTH). **Northern Territory.** Darwin & Gulf: 10.8 km ESE of Nourlangie Ranger Station on Pine Creek Road, May 1980, *Lazarides 8815* (BRI, CANB); Elcho Island, Jul 1975, *Latz 6277* (BRI, DNA). **Queensland.** Cook District: Freshwater, near Cairns, Jul 1943, *Blake 14977* (BRI, CANB, NSW). North Kennedy District: Cardwell, Sep 1935, *Blake 9692* (BRI, CANB, K, MEL, MO, NSW, PERTH).

***Distribution and habitat*:** *Isachne minutula* occurs in damp shaded forests and swampy areas from tropical Asia (Indian subcontinent), Indo-China, Malesia and Papuasia and across tropical Australia from the Kimberley region of Western Australia, through the Top End of the Northern Territory to northern coastal Queensland (**Map 10**).

***Phenology*:** Flowering March to July.



Map 10. Distribution in Australia and New Guinea of *Isachne minutula*

***Notes*:** Webster (1987) reports this species as being introduced to Australia under the misapplied name *Isachne pulchella*. However, information on herbarium labels from all localities indicate that it is a native component of wetlands in northern Australia.

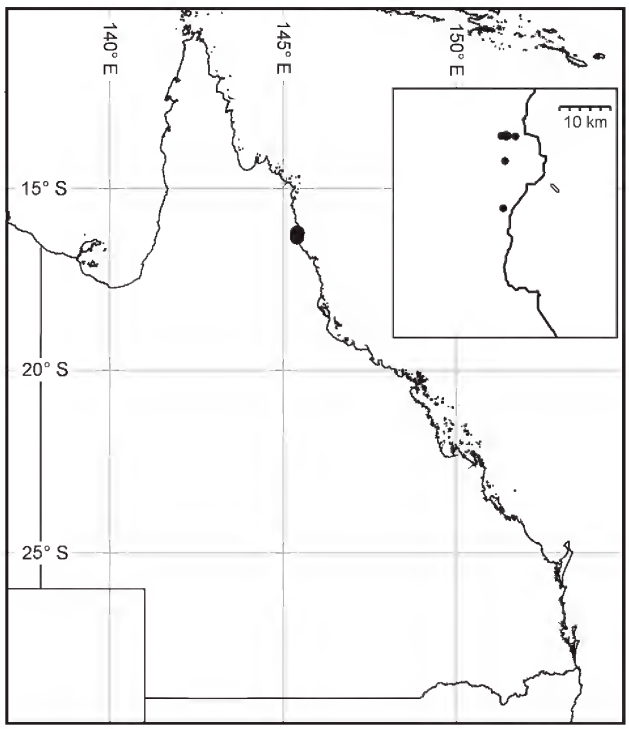
Isachne sharpii B.K.Simon, **species nova** *I. globosae* (Thunb.) Kuntze similis sed spiculis maioribus, glumis setiferis et apicibus acutis, flosculis ambobus bisexualibus differt. **Typus:** Queensland. Cook District: Palm Road, Cape Tribulation, 21 April 2001, *D.Sharp 293* (holo: BRI; iso: CANB, K, L, MO, NSW).

Isachne sp. A in AusGrass (Sharp & Simon 2002); *Flora of Australia* 43: 340, Map 924 (2002).

Isachne sp. (Cape Tribulation R.L.Jago 4560) (Simon *et al.* 2007: 158).

***Illustration*:** Sharp & Simon, *AusGrass* (2002) as *Isachne* sp. A.

Annual. Flowering culms 26–44 cm tall, 5–10-noded. Ligule a fringe of hairs, 1.5–1.7 mm long. Leaf blades 2.5–5.5 cm long, 7–13 mm wide. Inflorescence 3.5–4 cm long. Primary branches 1–1.4 cm long. Spikelets 3–7 on a typical lowermost primary branch, with both florets fertile, dorsally compressed, elliptic, 2.5–2.8 mm long, 1.2–1.5 mm wide; lower glume ovate, 2.5–2.8 mm long, 9-nerved, hairy, setose; upper glume 2.5–2.8 mm long, ovate, 9–10-nerved, hairy. Lower floret bisexual; lemma *c.* 2 mm long and 1.5 mm wide, cartilaginous to indurate, smooth, 5-nerved, with apex rounded; palea *c.* 1.8 mm long and 1.3 mm wide, cartilaginous to indurate; anthers 3, pale, to 1.5 mm long; caryopsis to 1.2 long and 0.8 mm, finely muricate, reddish. Upper floret bisexual, subequal to the lower floret; lemma *c.* 2 mm long and 1.5 mm wide, cartilaginous to indurate, smooth, 5-nerved; palea *c.* 1.8 mm long and 1.3 mm wide, cartilaginous to indurate; anthers 3, pale, to 1.5 mm long. **(Fig. 3.)**



Map 11. Distribution in Queensland of *Isachne sharpii* (inset shows local distribution)

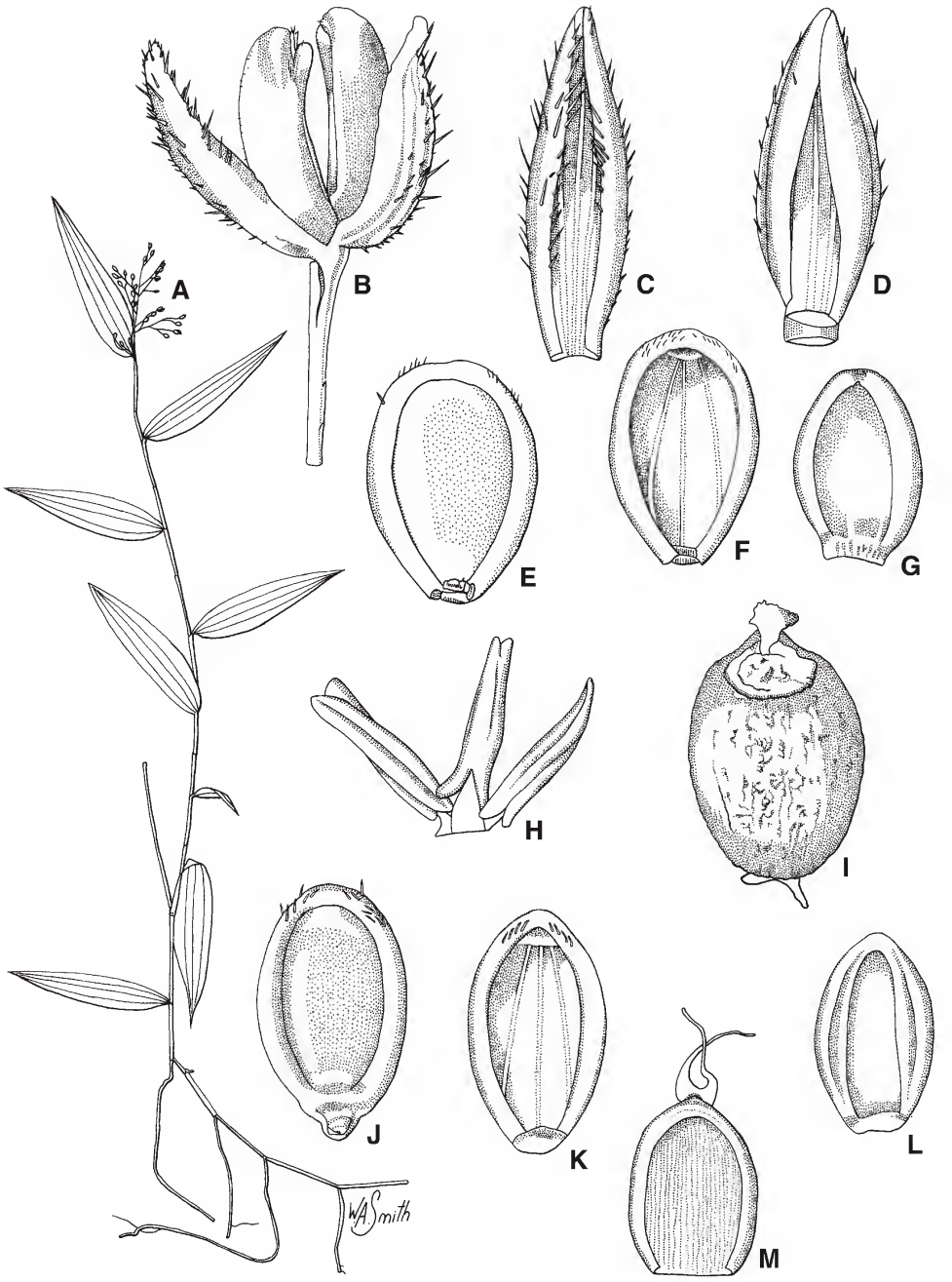


Fig. 3. ***Isachne sharpii***. A. habit × 0.4. B. spikelet, lateral view. C. lower glume; D. upper glume. E. lower floret. F. lower lemma. G. lower palea. B–G × 16. (C–G front view). H. anthers of lower floret. I. caryopsis of lower floret. H–I × 32. J. upper floret. K. upper lemma. L. upper palea (J–L front view). M. young caryopsis of upper floret. J–M × 16. All from *Sharp 293* (BRI). Del. W.Smith.

***Additional specimens examined*: Queensland.** Cook District: Palm Road, Cape Tribulation, Dec 1997, *Jago 4560* (BRI); *ditto loc.*, May 2001, *Jago 5978* (BRI); *ditto loc.*, Jun 2002, *Gray & Jones 8188* (BRI, CNS); *ditto loc.*, Nov 2006, *Simon 4330 & Jago* (BRI, K, US); Cape Tribulation Road, *c.* 700 m N of Daintree River ferry, Oct 2008, *Jago 7206* (BRI); Cape Tribulation Road, *c.* 1.2 km N of Daintree River ferry, Aug 2008, *Jago 7156* (BRI).

***Distribution and habitat*:** This species has only been collected from the understorey of rainforest or swamps dominated by *Licuala ramsayi* in a fairly restricted region of the Daintree rainforest, north-east Queensland (**Map 11**).

***Phenology*:** Flowering October to August.

***Notes*:** This species differs from the more widespread species *Isachne globosa* by the glumes being covered with bristles and having pointed apices as opposed to glabrous glumes rounded at the apex and by both florets being fertile. Both species have larger spikelets than the two other Australian species *I. confusa* Ohwi and *I. minutula*.

***Etymology*:** Named for Donovan Sharp, co-author of *AusGrass* (Sharp & Simon 2002) and collector of the type specimen.

7. A change of status in *Oplismenus* P.Beauv.

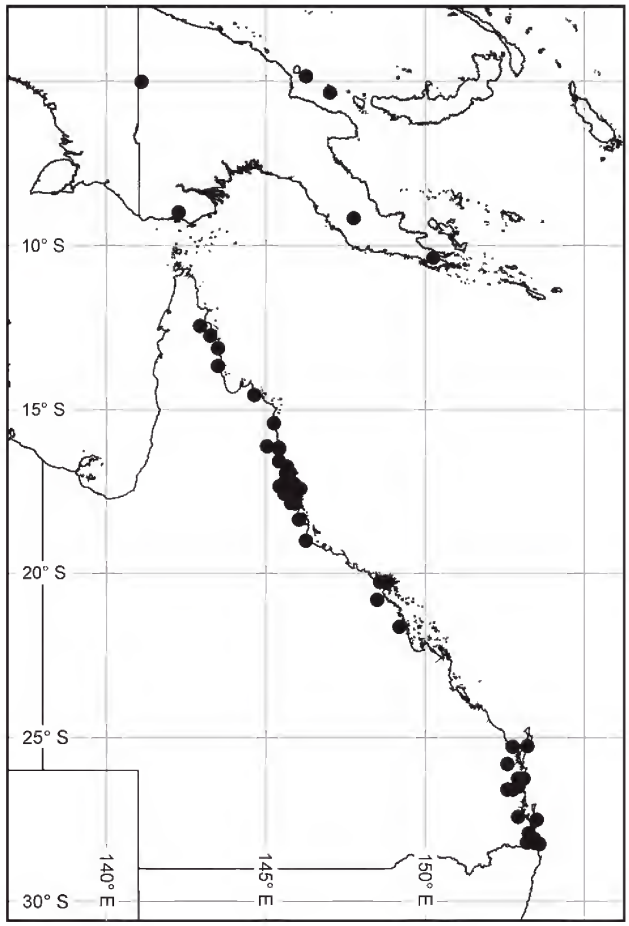
The genus *Oplismenus* consists of 11 species (Simon *et al.* 2010) native to the tropics and subtropics, with 5 species native to Australia. It is a genus of very similar species and there have been two attempts at a world-wide taxonomic treatment (Davey & Clayton 1978; Scholz 1981). The latter has a few species with many infraspecific taxa, whereas in the former the species rank is assigned to recognisable morphological forms. This may be considered a more practical approach, which I am adopting for the *FOA* account, although it may be difficult to extend the application of this species concept for all species beyond Australia (Davey & Clayton 1978).

Oplismenus mollis (Domin) Clifford & Evans ex B.K.Simon **stat. nov.**; *Oplismenus undulatifolius* var. *mollis* Domin, *Biblioth. Bot.* 85: 329 (1915). **Type:** Queensland. Moreton District: Tambourine Mountains, March 1910, *K.Domin 1311* (lecto: PR [here selected] [photo at BRI]; isolecto: BRI).

***Notes*:** Preliminary work towards an Australian revision of *Oplismenus* by Clifford & Evans (unpublished ms.) elevated this Australian entity to species rank and I agree with this position. An examination of the isotype of the basionym of *O. undulatifolius* (Ard.) Roem. & Schult. (*Panicum undulatifolium* Ard.) from M and of illustrations of this taxon in Scholz (1981, fig. 38) and in Trinius (1829, fig. 192) shows this species to differ from the Australian entity by the spikelets not being fascicled in the same way on the inflorescence racemes, by the leaf blades being broader and glabrous and the leaf sheaths being hairy with longish hairs.

Diagnostic features of *Oplismenus mollis* include the smooth awn, the lowermost primary branches reduced to fascicles and densely short and soft pubescence of the culm, sheaths and blades. It differs from *O. imbecillis* (R.Br.) Roem. & Schult., a related Australian species, by the racemes being in distinct fascicles and by a dense leaf blade indumentum.

***Distribution and habitat*:** *Oplismenus mollis* is distributed throughout coastal Queensland and north-east New South Wales; it is also in New Guinea (**Map 12**). It occurs in rainforest or its margins.



Map 12. Distribution in Australia and New Guinea of *Oplismenus mollis*

8. Recognition of both *Paractaenum* P.Beauv. and *Plagiosetum* Benth.

Webster (1987) placed *Plagiosetum* in synonymy with *Paractaenum* based on a similar type of bristle structure. However, there are a number of diagnostic morphological features readily observable between the two genera (**Table 2**) that do not justify placing them together.

Table 2. Comparison of character states for *Paractaenum* and *Plagiosetum*

Paractaenum	*Plagiosetum*
Primary inflorescence branch producing simple unbranched bristles, each accompanied by a spikelet	Primary inflorescence branch producing 2–3 spikelets with each spikelet subtended by branched bristles
Rachilla between the glumes not distinct	Rachilla between the glumes distinct
Pedicels less than 0.5 mm long	Pedicels 1.2–3.4 mm long

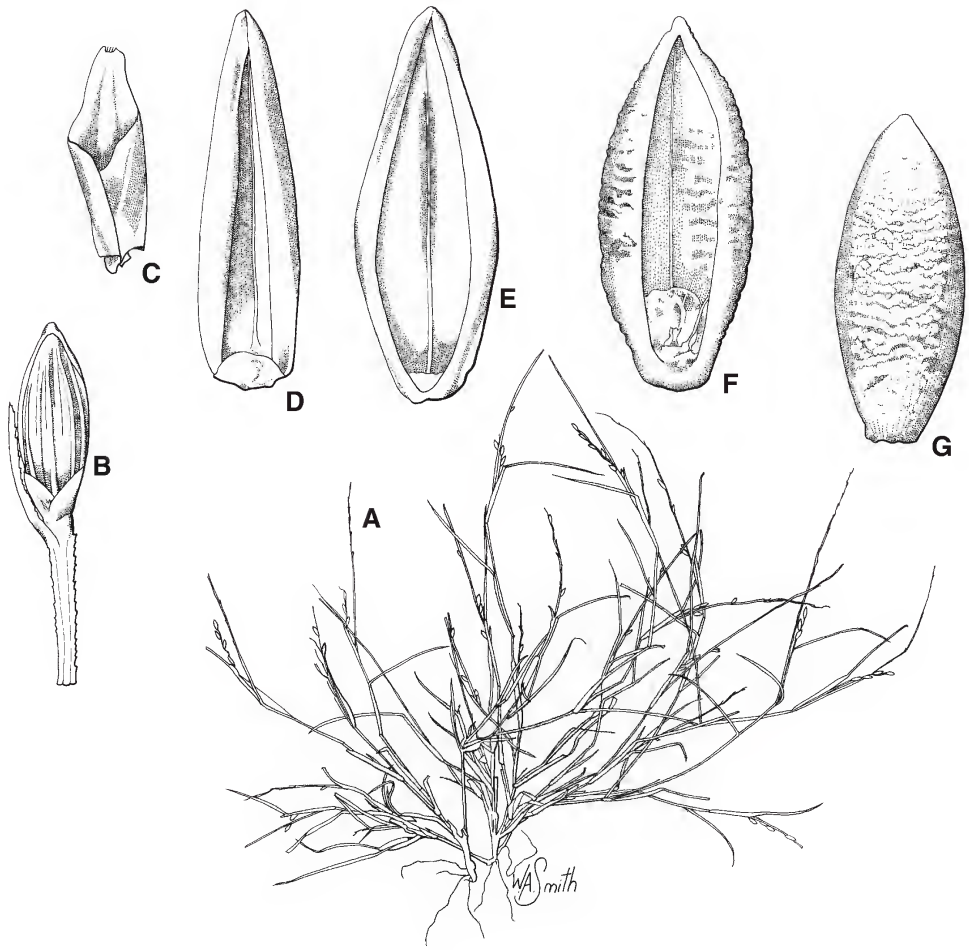


Fig. 4. ***Paspalidium johnsonii***. A. habit × 0.3. B. spikelet and bristle × 6. C. lower glume. D. upper glume. E. lower lemma. F. upper floret. (C–F front view). G. upper floret, back view. C–G × 0.3. All from *Johnson MRS792 & Thomas* (BRI). Del. W.Smith.

Hughes (1923) re-examined and emended the description of *Paractaenum novae-hollandiae* P.Beauv. She noted that there was a closer affinity of the genus *Paractaenum* to the genus *Plagiosetum*, with regards to the shape and nervation of the glumes and the flattened rachis, than there was to *Panicum*, under which an infraspecific taxon of *Paractaenum novae-hollandiae* (subsp. *reversum* (F.Muell.) R.D.Webster) had been described as *Panicum reversum* F.Muell. However, she retained both genera and two other contemporary references also maintain the distinction between these genera (Clayton & Renvoize 1986; Jacobs *et al.* 2008). A recent *ndhF*-based phylogeny of *Setaria* and allied genera of the bristle clade of panicoid grasses (Kellogg *et al.* 2009) placed *Plagiosetum refractum* (F.Muell.) Benth. in a clade between *Paspalidium rarum* (R.Br.) Hughes and the other Australian species of *Paspalidium*. *Paractaenum novae-hollandiae* has not yet been placed in the molecular based phylogeny and this should better clarify its relationship with *Plagiosetum*.

9. A new species of *Paspalidium* Stapf

Paspalidium is a genus of 42 species, with 22 native in Australia (Simon *et al.* 2010).

The key distinctions between some of the Australian species of *Paspalidium* appear very fine in some cases and more study is needed to establish whether some of these species should be maintained. A new species from the Burke District of Queensland falls into this category.

Paspalidium johnsonii B.K.Simon, **species nova** *P. raro* (R.Br.) Hughes similis spiculis brevioribus et culmis plus decumbentibus differt. **Typus:** Queensland. Burke District: Amphitheatre, 40 km N of Musselbrook Mining camp, 3 May 1995, *R.W.Johnson MRS792 & M.B.Thomas* (holo: BRI; iso: DNA, K *distribuendi*).

Paspalidium sp. (Musselbrook R.W.Johnson+ MRS792) (Simon *et al.* 2007: 161).

Annual. Flowering culms decumbent, ultimately erect, 7–20 cm long, 3–5-noded, sheaths not overlapping. Leaves glabrous; sheaths with eciliate margins; ligule 0.3–0.4 mm long; blades involute, 1–4 cm long, 5–7 mm wide. Inflorescence 1.5–4 cm long, lower branches shorter than adjacent internode of axis between them, branches reduced to 1 (rarely 2) spikelets, 0.4–0.6 cm long, appressed to the main axis. Spikelets 2.1–2.5 mm long, 0.9–1 mm wide and 1 or 2 on a typical lowermost primary branch, dorsally compressed to planoconvex, elliptic. Glumes glabrous; lower glume *c.* 1.5 mm long, triangular to ovate, 5-nerved; upper glume 2.1–2.5 mm long, elliptic, 7-nerved, muticous. Lower floret sterile; lemma 2.1–2.5 mm long, acute, 5-nerved. Upper floret curved in profile; lemma 2.1–2.4 mm long, yellow, finely transversely rugulose, yellow. **Fig. 4.**

***Distribution and habitat*:** Only known from the type locality in Queensland (**Map 9**) where it was collected from open woodland on shallow sandy soil overlying a sandstone escarpment.

***Phenology*:** Flowering April to May.

***Notes*:** This species is similar to *Paspalidium rarum* but with much smaller spikelets and the culms are more decumbent.

***Etymology*:** Named for Dr R.W. (Bob) Johnson, former Director of the Queensland Herbarium (1974–1990) and collector of the type specimen.

10. A new species and a new variety of *Pseudoraphis* Griff.

In November 2003 Robert Jago sent in for identification a delicate grass from an old swale within the Bale Condominium development at Port Douglas, north-east Queensland. An examination of the spikelets revealed that he had collected a very unique grass, in terms of its unusual spikelet morphology. In that it was not able to be readily identified presented a situation whereby a new plant species, and possibly one having a threatened status, was present in an area where existing native vegetation was destined to be cleared and replaced by landscaped vegetation of exotic horticultural plants. Fortunately attention was drawn to the presence of this unique grass at a stage where the developers were in a position to alter drainage plans that would otherwise have radically altered the ground cover of the swale. It has been possible to avoid for now the destruction of this grass and to retain this patch of native vegetation within the condominium boundary.

It was initially difficult to place this grass in the genus *Pseudoraphis* on account of the problem of observing the naked bristle at the apex of an inflorescence branch. The bristle, a feature that is diagnostic for the genus, is sometimes reduced or absent. *Pseudoraphis* is a genus of 10 species (Simon *et al.* 2010) of aquatic habitats from tropical and subtropical Asia to Australia.

Pseudoraphis jagonis B.K.Simon, **species nova** *P. minuta* (Mez) Pilger similis sed spiculis longioribus et laminis tenioribus differt. **Typus:** Queensland. Cook District: Port Douglas, 27 November 2003, *R.L.Jago 6610* (holo: BRI; iso: CANB, K, L, MO, NSW, SI *distribuendi*).

Pseudoraphis sp. (Port Douglas R.L.Jago 6610) (Simon *et al.* 2007: 162).

Flowering culms 15–40 cm tall, 7–14-noded. Nodes pubescent. Leaves; ligule 0.2–0.3 mm long; blades 1–6 cm long, 0.5–1.5 mm wide.

Fig. 5. ***Pseudoraphis jagonis***. A–C. spikelet, pedicel and bristle of three spikelets, showing variation in bristle length, lateral view × 12. D. lower glume, front view. E. upper glume, front view. F. lower lemma, front view. G. lower palea, front view. H. anthers. I. upper lemma, back view. D–I × 40. All from *Jago 6610* (BRI)). Del. W.Smith.

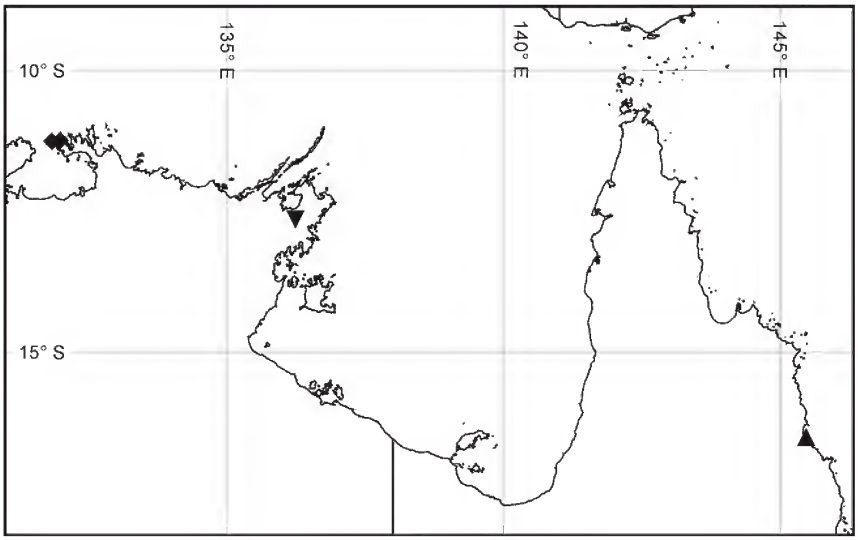
Inflorescence 2–5 cm long with primary branches spreading; bristles 2–3 mm long. Pedicels 0.5–9 mm long. Spikelets 2–4 on a typical lowermost primary branch, 4–5 mm long, 0.6–0.8 mm wide. Glumes: lower glume 0.2–0.3 mm long, broadly oblong; upper glume 4–5 mm long, 13–15-nerved, glabrous to scabrous. Lower floret: lemma 2.5–3 mm long, 0.8–0.9 mm wide, 7-nerved; palea 2–2.2 mm long; anthers 2, *c.* 1.3 mm long. Upper floret 1.5–1.7 mm long; lemma and palea membranous. **Fig. 5.**

***Additional specimens examined*: Queensland.** Cook District: Port Douglas, Nov 2006, *Simon 4328 & Jago* (infertile specimen) (BRI, L, K, NSW, US); *ditto loc.*, Oct 2005, *Wannan 4108 & Jago* (BRI); *ditto loc.*, Nov 2005, *Wannan 4137 & Gillanders* (BRI); ex Port Douglas, cultivated at Speewah, Feb 2006, *Wannan 4199* (BRI, CANB, L).

***Distribution and habitat*:** Restricted to Port Douglas, north-east Queensland where it is known from a condominium precinct (**Map 13**). Plants grow in damp soil in an old swale with *Dillenia alata*, *Lophostemon suaveolens*, *Pandanus solmslaubachii*, *Livistona muelleri* and *Melaleuca quinquenervia*.

***Phenology*:** Flowering October to November.

***Notes*:** The spikelet bristles, a general feature of the genus, are sometimes very short in this species.



Map 13. Distribution in northern Australia of *Pseudoraphis jagonis* ▲, *P. minuta* var. *minuta* ◆ and *P. minuta* var. *laevis* ▼

***Etymology*:** Named for Robert Jago, a keen plant collector from north Queensland.

Pseudoraphis minuta (Mez) Pilger, *Notizbl. Bot. Gart. Berlin-Dahlem* 10: 210 (1928); *Chamaeraphis minuta* Mez, *Notizbl. Bot. Gart. Berlin-Dahlem* 7: 48 (1917). **Type:** Vietnam: Tonkin, prope Hanoi ad paludum margines, 25 May 1886, *B.Balansa 1592* (lecto: BRI [designated here]; isolecto: L, P, US).

***Typification*:** The species was described as *Chamaeraphis minuta* by Mez (1917) with the citation of six syntypes (*C.B.Clarke 17040*, *B.Balansa 1592*, *B.Balansa 1593*, *B.Balansa 4779*, *Kurz s.n.*, *Keenan s.n.*). To avoid possible confusion concerning application of the name a lectotype is selected from a duplicate of *Balansa 1592*.

***Notes*:** This species is represented in Australia by very few specimens in herbaria and exists as two varieties, both known only from the Northern Territory (**Map 13**).

Pseudoraphis minuta var. **laevis** B.K.Simon, **varietas nova** *P. minuta* var. *minuta* similis sed glumis laevibus et glabris differt. **Typus:** Northern Territory. Darwin & Gulf: Goromuru River floodplain, 24 May 1992, *I.Cowie 2838* (holo: BRI; iso: CANB, CNS, DNA, K, L, MEL, MO, NSW, PERTH).

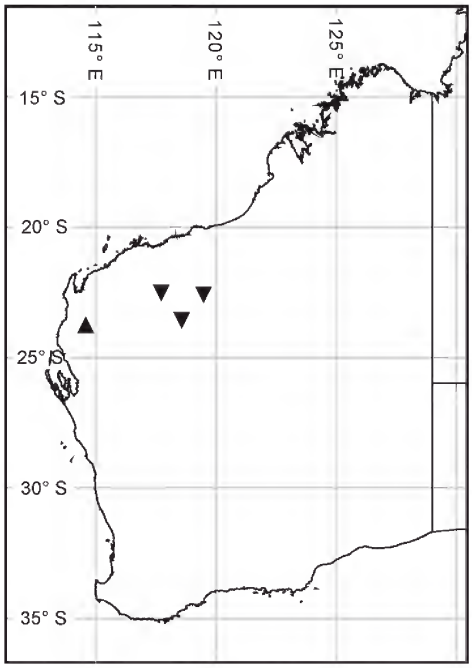
***Distribution and habitat*:** Only known from the Goromuru River floodplain of the Northern Territory, where it was observed as floating in shallow water (**Map 13**).

***Notes*:** The type variety, with tubercle based hairs on the glumes, extends from South-East Asia to the Northern Territory (**Map 13**). The only specimen that has been seen of the variety newly described here has glumes that are smooth and glabrous.

***Etymology*:** Named for the upper glume being smooth and glabrous.

11. A new combination in *Setaria* P.Beauv.

Veldkamp (1994) regarded *Setaria parviflora* (Poir.) Kerguélen to be "a very polymorphic species with an intricate nomenclature." He placed *Setaria pallide-fusca* Stapf & C.E.Hubb. in synonymy with *S. parviflora* on the basis of spikelet size (1.9–2.4 mm long). However, *S. parviflora* is a perennial with a short rhizome whereas *S. pallide-fusca* is an annual, and is currently regarded as a subspecies of *S. pumila* (Poir.) Roemer &



Map 14. Distribution in Western Australia of *Urochloa occidentalis* var. *occidentalis* ▲ and var. *ciliata*▼

Schultes by some authors (Sharp & Simon 2002; Rominger in Barkworth *et al.* 2003), although Clayton (1979) gives evidence of continuous variation between the two subspecies. As pointed out by Veldkamp (1994), if the subspecies is to be recognised, the epithet '*subtesselata*' has to have priority.

Setaria pumila subsp. **subtesselata** (Buse) B.K.Simon **comb. nov.**; *Setaria glauca* subsp. *subtesselata* Buse, *Pl. Jungh.* 3: 369 (1854). **Type:** *Junghuhn s.n. sh. 903.342-138* (lecto: L), *fide* Veldkamp (1994: 380).

Panicum pallide-fuscum Schumach., *Beskr. Guin. Pl.* 58 (1827); *Setaria pallide-fusca* (Schumach.) Stapf & C.E.Hubb., *Bull. Misc. Inform. Kew* 1930: 259 (1930) ("*pallidifusca*"); *S. glauca* var. *pallide-fusca* (Schumach.) Koyama, *J. Jap. Bot.* 37: 237 (1962); *S. pumila* subsp. *pallide-fusca* (Schumach.) B.K.Simon, *Austrobaileya* 2: 22 (1984). **Type:** Ghana, *s.dat.*, *P.Thonning 344* (holo: C).

***Notes*:** Veldkamp (1994) also placed *S. surgens* Stapf in synonymy with *S. parviflora*. However, the former does not have short knotty rhizomes as in *S. parviflora* and the latter has an upper glume that is greater than half the spikelet length, whereas in *S. surgens* the upper glume is ¾ the spikelet length.

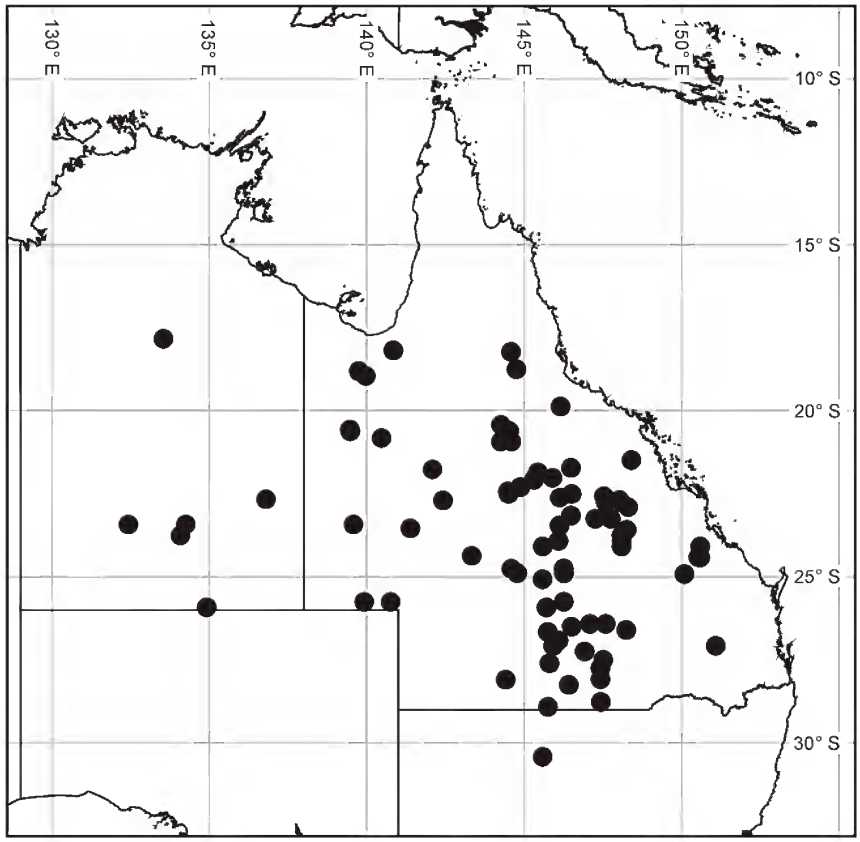
12. New combinations, a change of status and a lectotypification in *Urochloa* P.Beauv.

The genus *Urochloa* P.Beauv. was first recircumscribed 23 years ago on morphological evidence to accommodate all the Australian species of *Brachiaria* (Trin.) Griseb. except *B. eruciformis* (Webster 1987). This species was subsequently transferred to *Moorochloa* (Veldkamp 2004) for nomenclatural reasons. Since then other authors have transferred most other *Brachiaria* species to *Urochloa* for all regions of the world other than for all of the African species (Morrone & Zuloaga 1993; Veldkamp 1996; Ashalatha 1997; Torres Gonzales & Morton 2005) based on both morphological and molecular data.

In his treatment Webster (1987) established two subspecies of *Urochloa gilesii* (Benth.) Hughes, the type variety and subsp. *occidentalis* based on *Brachiaria occidentalis* C.A.Gardner & C.E.Hubb. These two taxa differ in overall spikelet size (3–4 mm long, 1.2–1.4 mm wide in subsp. *occidentalis* and 4–5 mm long, 1.4–1.8 mm wide in subsp. *gilesii*). I am of the opinion it is better to maintain species rank for these two taxa, necessitating a new combination.

Urochloa occidentalis (C.A.Gardner & C.E.Hubb.) B.K.Simon **comb. nov.**; *Brachiaria occidentalis* C.A.Gardner & C.E. Hubb., *Hooker's Icon. Pl.* 3363 (1938); *Urochloa gilesii* subsp. *occidentalis* (C.A.Gardner & C.E.Hubb.) R.D.Webster, *Austral. Paniceae* 238 (1987). **Type:** Western Australia. Minilya River, Wandagee Station, 29 August 1932, *C.A.Gardner 3227a* (lecto: K [photo BRI]; isolecto: BRI, K [photo BRI], PERTH [photo BRI]), *fide* Webster (1987: 238).

***Notes*:** Gardner & Hubbard (1938) indicated that *Urochloa occidentalis* (under *Brachiaria*) possessed hairy and glabrous spikelets and they decided to formally name the form with



Map 15. Distribution in Australia of *Urochloa gilesii* var. *gilesii*

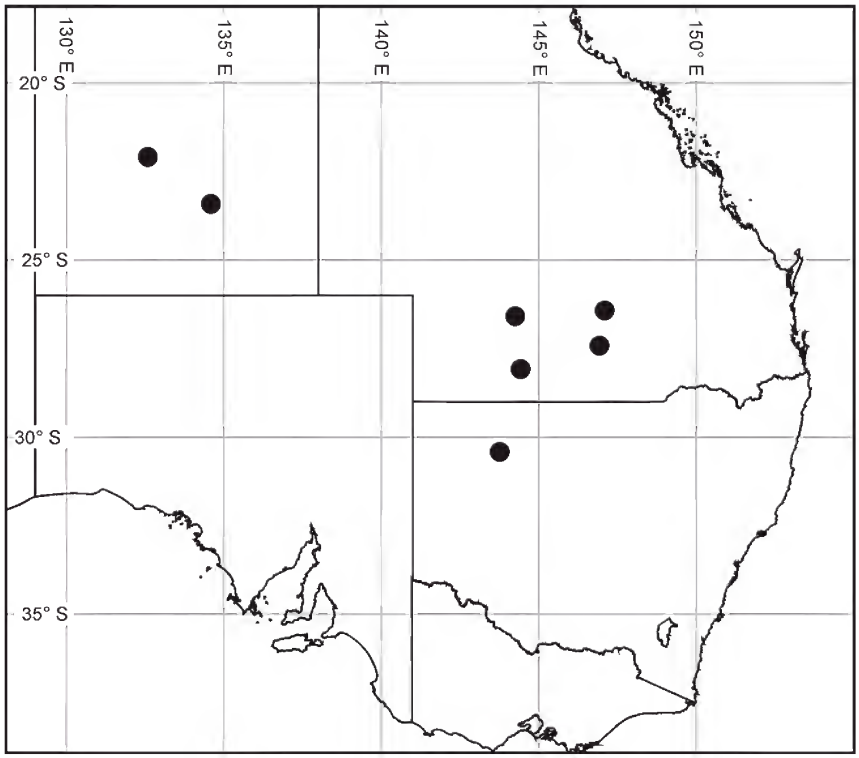
hairy spikelets as *Brachiaria occidentalis* var. *ciliata* C.A.Gardner & C.E.Hubb. A new combination of this variety is required under *Urochloa*. Both varieties are restricted to Western Australia (**Map 14**).

Urochloa occidentalis var. **ciliata** (C.A.Gardner & C.E.Hubb.) B.K.Simon **comb. nov.**; *Brachiaria occidentalis* var. *ciliata* C.A.Gardner & C.E.Hubb., *Hooker's Icon. Pl.* 3363: 3 (1938). **Type:** Western Australia. Turee Station, October 1933, *MacGuire s.n.* (lecto: PERTH00995703 [here chosen] [photo BRI]; isolecto: BRI, K [photo BRI]).

***Notes*:** Webster (1987) lectotypified the varietal name on the material at K of this variety; however, an examination of the two PERTH isolectotypes (PERTH00995703 and PERTH00995711) of MacGuire's has revealed that one of these specimens has hairy spikelets and the other glabrous spikelets, so that a new lectotypification is necessary.

Urochloa gilesii var. **nothochthona** (Domin) B.K.Simon **comb. et stat. nov.**; *Panicum notochthonum* Domin, *Repert. Spec. Nov. Regni Veg.* 10: 60 (1911); *Brachiaria notochthona* (Domin) Stapf in D.Prain (ed.), *Fl. Trop. Afr.* 9: 597 (1920); *Urochloa notochthona* (Domin) Hughes, *Bull. Misc. Inform. Kew* 1923: 319 (1923). **Type:** New South Wales. Darling River, *s.dat.*, *J.Dallachy* (holo: K [photo BRI]; iso: BRI).

Panicum heteroneuron Mez, *Repert. Spec. Nov. Regni Veg.* 17: 83 (1921). **Type:** New South Wales. Tongo Station, Wilcannia, *s.dat.*, *W.J.Hourigan s.n.* (holo: B; iso: BRI, NSW).



Map 16. Distribution in Australia of *Urochloa gilesii* var. *nothochthona*

***Notes*:** Webster (1987) placed *Urochloa notochthona* into synonymy with *U. gilesii* as the spikelets of these two species are similar in all respects, other than the spikelets of *U. notochthona* being glabrous and those of *U. gilesii* hairy. For the latter reason I feel recognition of the two taxa is best represented at varietal rank.

There is a difference in the distribution of *U. occidentalis* and *U. gilesii*, with the former (**Map 14**) being endemic to the Pilbara region of Western Australia, and the latter (**Maps 15** and **16**) from the arid and semi-arid regions of central and south-east Australia.

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SHORT COMMUNICATION

Three new combinations in *Pterostylis* (Orchidaceae)

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Janes *et al.* (2010) presented a molecular phylogenetic study of subtribe *Pterostylidinae* Pfitzer and concluded that the species in the tribe should be placed in one genus *Pterostylis* R.Br., and not the 16 genera as proposed by Szlachetko (2001) and Jones & Clements (2002) (see review in Janes *et al.* 2010). A new classification system for the tribe with one genus, two subgenera and 10 sections was described by Janes & Duretto (2010). Janes & Duretto (2010) also transferred seven species from various genera to *Pterostylis* and thus for the first time in several years workers have been able to apply formal names in *Pterostylis* to all species placed in subtribe *Pterostylidinae*.

When describing the new infrageneric classification system for *Pterostylis* Janes & Duretto (2010) made two errors. The first was not formally transferring *Oligochaetochilus* Szlach. section *Oligochaetochilus* to *Pterostylis* (see Article 21.1, I.C.B.N., McNeill *et al.* 2006). The second was making the new combination *Pterostylis* section *Parviflorae* (Benth.) Janes & Duretto. This name is illegitimate because for this taxon the name *Speculantha* D.L.Jones & M.A.Clem. section *Speculantha* is available and has priority (see Article 11, I.C.B.N., McNeill *et al.* 2006). Two new combinations are made below to correct these issues.

Jones (2010) recently described a new species, *Oligochaetochilus mystacinus* D.L.Jones, from Queensland and the new combination transferring it to *Pterostylis* is also made below. The species is placed in *Pterostylis* section *Oligochaetochilus*.

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Taxonomy

1. Pterostylis section **Oligochaetochilus** (Szlach.) Janes & Duretto **stat. & comb. nov.**; *Oligochaetochilus* Szlach., *Polish Bot. J.* 46: 23 (2001).

For a complete list of synonyms see Janes & Duretto (2010).

2. Pterostylis section **Speculantha** (D.L.Jones & M.A.Clem.) Janes & Duretto **stat. & comb. nov.**; *Speculantha* D.L.Jones & M.A.Clem., *Austral. Orchid Res.* 4: 82 (2002).

Speculantha section *Elongatae* D.L.Jones & M.A.Clem., *Austral. Orchid Res.* 4: 83 (2002).

Petrorchis D.L.Jones & M.A.Clem., *Austral. Orchid Res.* 4: 78 (2002).

Pterostylis series *Parviflorae* Benth., *Fl. Austral.* 6: 353, 360 (1873); *Pterostylis* section *Parviflorae* (Benth.) Janes & Duretto, *Austral. Syst. Bot.* 23: 264 (2010), *nom. illeg.*

3. Pterostylis mystacina (D.L.Jones) Janes & Duretto **comb. nov**.; *Oligochaetochilus mystacinus* D.L.Jones, *The Orchadian* 16(8): 372 (2010).

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SHORT COMMUNICATION

Ardisia hylandii Jackes: a new name for *Ardisia depauperata* (Domin) Jackes

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Subsequent to the publication of *Ardisia depauperata* (Domin) Jackes in 2009, it was found that this name was a later homonym. The combination *Ardisia depauperata* (Mez) Bernacci & Jung-Mendaçolli had been made based on the transfer of *Stylogyne depauperata* Mez to *Ardisia* (Bernacci & Jung-Mendaçolli 2000: 246). This species is restricted to an area in southeastern Brazil. The Australian material was originally described by Domin (1928) as *Ardisia brevipedata* ? var. *depauperata.* The new specific epithet has been chosen to honour Bernie Hyland, who made excellent collections (*Hyland 8778*) of this species from the South Mary Logging Area (now National Park) in the Mt Lewis area.

Ardisia hylandii Jackes **nom. et stat. novus**; *Ardisia brevipedata* ? var. *depauperata* Domin, *Biblioth. Bot.* 89: 502 (1928); *A. depauperata* (Domin) Jackes, *Austrobaileya* 8: 11 (2009), *nom. illegit.*, *non* (Mez) Bernacci & Jung-Mendaçolli. **Type:** Queensland. Cook District: montes Bellenden-Ker ["Ein Strauch in der mittleren Region des Bellenden-ker"], December 1909, *K.Domin 7657* (holo: PR530275 [photograph seen, photos at BRI, CANB, CNS and NSW]).

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